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SELECTED PAPERS.

Observations on the Vascular Appearance in the Human Stomach, which is frequently mistaken for Inflammation of that Organ. By JOHN YELLOLY, M. D. Physician to the London Hospital.

[From the London Medico-Chirurgical Transactions for 1813.]

IT must have happened to every one accustomed to the examination of morbid bodies, to see appearances of vascular fulness in the villous coat of the stomach. Such appearances have very frequently been referred to inflammation; but they have probably been but little studied; because, in dissections, the stomach is seldom opened, unless the attention be particularly directed to that organ, either from something remarkable in its external appearance, or some particular symptom affecting it, which may have been the subject of observation during life. I have several times been present at the examination of bodies, where the vascularity of the villous coat of the stomach was so considerable, as even to give rise to suspicions, that

this appearance had been produced by the agency of something deleterious. In some remarkable cases, too, which fell under my own immediate inspection, (particularly one of apoplexy, and another of hydrothorax,) the phenomena now mentioned, existed to a very considerable degree, without there having been present, during life, any symptom which could make an affection of the stomach looked for.

I was therefore induced to embrace frequent opportunities of viewing the state of the inner surface of the stomach; and I so often found in it the appearances alluded to, as to incline me to imagine, that the opinion which is commonly entertained, of their being marks of disease, is not well founded. I thought it, however, desirable to make a continued series of examinations as to this point, in subjects taken indiscriminately, and therefore without any reference to the disease of which they might have died; hoping, by this means, to obtain such a portion of evidence, as might warrant some deduction, as to the ordinary appearances of the villous coat of the human stomach, in the dead body. I shall therefore lay before the Society, an account of twenty successive dissections, made by me, with a more particular view to the state of the stomach: and shall then give the appearances which that organ presented, in the bodies of five criminals, who forfeited their lives to public justice, and where there might be expected to be as little deviation as possible, from natural and healthy structure, and appearance.* The twenty dissections were principally made in cases which occurred at the London Hospital, under the care of my colleagues, (the physicians and surgeons of that establishment,) or myself; and the appearances were generally noted down by me at the time of inspection. I shall give one of them separately; but as I am aware that a detail of cases, where there is no material diversity in the individual particulars, is very tedious, I shall reduce the others to a tabular form.

It may be proper to remark, that in removing the stomachs,

* It will be obvious, from the dates, that several of the cases and observations have been added since this paper was communicated to the Society.

for the purpose of examination, a ligature was made at each extremity, and a portion of the œsophagus and duodenum included within it; and in order that no unnecessary pressure should be made on the tender villous coat in the inversion, an incision was made in the anterior part of the stomach, from the extremity of the duodenum, through the pylorus, of sufficient size to admit of its being readily inverted.

John Bate, aged thirty-six, porter, was admitted into the London Hospital on Feb. 23, 1813, with general dropsy; and after the unsuccessful employment of various means for his relief, he gradually sunk, and died on May 11. There had been no affection of the stomach. He was opened on the day of his death.

In both cavities of the thorax, there was a considerable quantity of bloody serum, and some also in the pericardium. The heart was large and firm; and there was a small and slight adhesion of it to the pericardium. Some bloody serum was found in the abdomen; and a strong band attached the lower part of the ilium to the peritonæum contiguous to it. The spleen was considerably larger than usual; and it adhered extensively and strongly to the diaphragm, and slightly to the colon. Its substance was firm; and the whole of its external surface (that towards the ribs) was covered with a thin layer of white, smooth, cartilage.* The liver was natural in appearance; but the cystic bile was very pale. Nearly the whole of the great end of the stomach, on the posterior part, including a surface of somewhat a round form, and of about five inches by four in dimension, was of a bright crimson colour, which arose from very numerous points, as if of extravasation, very near the internal surface of the villous coat, and a slight regular vascularity. Similar points, well defined, and of various sizes, were seen in other parts of the stomach, particularly near the pylorus. The plicæ were numerous, near the pylorus, and towards the left inferior extremity of the greater curvature.

* A similar affection of the spleen is described in Baillie's Morbid Anatomy, p. 256.

No.	Name, &c.	Died.	Examined.	Disease.	Appearances of Villous Coat of Stomach.
1	James Taylor, aged about 55, wine porter.	1813. March 30.	1813. April 1.	Apoplexy; effusion of blood in Pons Varolii. Was subject to rheumatism. No affection of stomach.	Considerable portion of great end very vascular, and with occasional appearance of extravasation, in form of small points.
2	James Murray, aged 47, seaman.	April 13.	—— 13.	Severe accident in the leg, making amputation necessary. No affection of stomach.	Lesser curvature, for about four inches by three, and a small irregular portion round the cardia, with considerable, and rather florid vascularity. Points of extravasation, in several parts of great end, and pyloric portion.
3	Dan. M'Lauglin, aged 47, labourer.	—— 14.	—— 16.	Convulsive fits, following, in 3 days, amputation of the leg for an old ulceration, coming on at short intervals, and producing stupor. No affection of stomach.	One-third of the superficial dimensions, comprising nearly the whole of the great end, and a portion of the lesser curvature, exhibited minute purple vessels, without regular junction. Here and there points of extravasation.
4	Jer. Davis, aged 19, labourer.	—— 14.	—— 16.	Tetanus, coming on with lock-jaw, on April 9th, without apparent cause. No affection of stomach.	Slight extravasation in irregular points, in lesser curvature and great end. Œsophagus very vascular.

No.	Name, &c.	Died.	Examined.	Disease.	Appearances of Villous Coat of Stomach.
5	Thomas Holbird, aged 40, labourer.	1813. April 27.	1813. April 29.	Pulmonary consumption. No affection of stomach.	Lesser curvature, and various small portions in other parts, particularly at inferior part of great end, very vascular.
6	William Somerville, aged 56, labourer.	—— 28.	—— 29.	Extravasation of urine into perinæum from stricture; and consequent gangrene. No affection of stomach.	Slight crimson blush over principal part; and portions of distinct, and well defined vascularity, in several places.
7	Andrew Bailey, aged 26, seaman.	—— 30.	May 1.	Pleuritis following amputation at shoulder joint, on account of a severe bruise. A little vomiting before death.	Lesser curvature, with four square inches of minute vessels or points. Similar appearances in some other places.
8	Emanuel Francis, aged 40, seaman.	May 1.	—— 1.	Pulmonary consumption. No affection of stomach.	Two square inches of lesser curvature, and a portion at great end, with minute florid vascularity, and slight pointed extravasation.
9	Johan Dichtmeyer, aged 31, shoemaker.	—— 2.	—— 3.	Pulmonary consumption. No affection of stomach.	Great end, with dark crimson, uniform tinge. Lesser curvature, three inches by two, and neighbourhood of pylorus had portions of distinct vascularity, with a few extravasated points.

No.	Name, &c.	Died.	Examined.	Disease.	Appearances of Villous Coat of Stomach.
10	Benjamin Foynett, aged 53, ticket porter.	1813. May 9.	1813. May 11.	Pleuritis supervening on severe catarrh, to which he was subject. Occasional pains in stomach for some years.	Reddish blush over principal part. Some of the plicæ near the pylorus, much elevated, dark-coloured and semi-cartilaginous.
11	John Bate, aged 36, porter.	—— 11.	—— 11.	General dropsy.	Case given above, p. 3.
12	Thomas Gingham, aged 65, labourer.	—— 14.	—— 15.	Compound fracture of leg. No affection of stomach.	The lesser curvature, and much of both anterior and posterior surfaces livid. Some vascularity and points near the pylorus.
13	Mary Roston, aged 27.	—— 19.	—— 21.	Ulcerated leg. No affection of stomach.	Very obscure vascularity near the pylorus.
14	Thomas Woodfield, aged 47, watch-maker.	—— 20.	—— 21.	Pulmonary consumption; with strictures, and enlarged prostate. No affection of stomach.	Two square inches of lesser curvature, and principal part of great end, amounting, in the whole, to one-half the superficial contents, with sometimes florid, but generally blackish purple vascularity, for the most part distinct. Some florid vessels also near the pylorus, and in the duodenum.
15	Joseph Francis, aged 45, seaman.	—— 21.	—— 21.	Compound fracture of leg, making amputation necessary. Slight sickness on last day.	Nearly the whole surface of a bright red colour, from small points; but there was little distinct vascularity.

No.	Name, &c.	Died.	Examined.	Disease.	Appearances of Villous Coat of Stomach.
16	James Sheppard, aged 22, labourer.	1813. May 25.	1813. May 25.	Ulceration of larynx, and of villous coat of small intestines. No affection of stomach.	No vascularity.
17	Eman. Evans, aged 70, labourer.	—— 26.	—— 27.	Peritonæal inflammation from punctured bladder. No affection of stomach.	Extensive florid vascularity in minute ramifications.
18	—— Wakefield, middle-aged man.*			Pulmonary consumption.	A considerable space on the posterior surface below the cardia, and a smaller at the lesser curvature and anterior surface, florid, and consisting partly of points and partly ramifications. Lines of fine vascularity along the plicæ.
19	Robert Gowlett, aged 34, labourer.	June 17.	June 19.	Irregular protracted fever. Dyspeptic complaints for some years; and latterly, irritability of stomach.	Almost whole surface with florid vascularity; sometimes in distinct vessels, sometimes in pointed extravasations.
20	Henrietta Hatt, aged 34.	—— 26.	—— 27.	Schirrous uterus; large intestines contracted. Old syphilitic complaints.	Slight appearance of rather dark red vascularity and points, both in the lesser curvature and great end.

* Some mistake arose as to the name and the description of this man, at the time of dissection, which I have not been able to rectify.

Before I make any remarks on the cases which have been given, and the appearances which they offer, I shall proceed to lay before the Society a description of the state of the stomach in five malefactors, who suffered death for murder, and who, before their execution, were in good health.*

CASE I.

Philip Nicholson, a man of about thirty years of age, was executed at Penningden Heath, near Maidstone, on the 23d of August 1813, at two o'clock in the afternoon. The body was taken to Bromley the same night, and was opened in my presence, and the stomach examined by me, on the following day, at 3 o'clock in the afternoon.

The whole of the abdominal viscera were loaded, as if by minute injection, with dark-coloured blood. Here and there, however, there were florid vessels, which were distinctly traceable into dark-coloured ones.

The stomach had its external vessels very turgid. It had no fluid contents; but on inverting it, after an incision was made in the anterior part, through the pylorus, the whole cavity was found lined with dark-coloured, clotted blood, which was pretty firmly attached to the villous coat and its mucus, and came off, but with some little difficulty, on putting the whole into water. Much of it, however, still continued to hang about the plicæ, at the great end, though the other parts were freed. The plicæ were distinct over the whole stomach, but not much elevated. Where the blood was washed off, it discovered the whole surface of the villous coat of a red colour; dark, where a portion of the blood continued to adhere; but florid, where it had been separated. The florid appearance was produced by minute vessels, which were, in general, distinct; but here and there in points, and occasionally in apparent daubs, consisting

* I was indebted to the kindness and liberality of several professional friends, for the opportunity of these examinations.

of extravasations, more or less extensive, and when more closely examined by a glass, divided into smaller portions of extravasation. The vascularity was unequal, being sometimes in irregular lines, with small portions of the proper straw-coloured hue of the villous coat interposed. Where the straw colour was pretty well marked, (which was in very few places,) there were still seen appearances of faint, and minute vascularity, in the substance of the villous coat, which imparted a very obscure red tinge to the straw-coloured hue.

On dissecting off the villous coat, its inner surface was found to be covered with numerous vessels, which were connected with larger ones, and were traceable into the substance of the villous surface.

The stomach was reverted; and on examination the following day, it was found, in many places, to have lost the florid vascular appearance above mentioned, and to have become of a pretty uniform crimson hue. It was then put into rectified spirit; but in the course of a few hours, was deprived, not only of the slight remains of vascularity which it possessed, but altogether of its sanguineous hue, assuming a brown tint, which it still preserves.*

CASE II.

Charles Masureaux, a young French prisoner, was executed at Gillingham in Kent, on Monday the 23d of August, 1813, early in the forenoon. The stomach was taken out on the Tuesday, was sent to me in London on the Wednesday evening, and was examined on the Thursday morning.—It had been tied up at both openings, and a portion of the contents left in it. It was transmitted in a jar, at my request, without spirit or other fluid put up with it.

* Nicholson was reported to have died unusually hard, and to have been greatly convulsed. *Times Paper* of Aug. 25.

The external surface was very vascular, and of a light purple hue.—There was a large spot near the pylorus, and another in the greater curvature, of a green colour, which extended through the whole substance of the stomach; but there was no diminished cohesion in these parts. The stomach contained about three or four ounces of bloody, thick, and somewhat frothy fluid. The whole of the villous coat (with the exception of the green spots, and some dark coloured streaks, which answered nearly to the plicæ of the stomach,) was of a bright crimson colour. No vascular appearance was perceptible in any part of the stomach, except in one spot near the pylorus, and in another in the lesser curvature, near the cardia, where a distinct portion of vascularity was seen at the extremity of the villous coat. Very obscure vessels were observable between the villous and muscular coats, on dissecting off the former, at various places.

CASE III.

William Cornwall, aged about 25, was executed at Woodford, at 11 o'clock in the forenoon, of Monday the 9th of August, 1813. The body was conveyed to town on the same day; and was opened in my presence, and the stomach examined by me, at half past two o'clock on the following afternoon.

The whole surface of the body, (but particularly the lower extremities) had on it numerous small vesications in the form of wheals, without redness, of about an inch and a half in length, and a tenth of an inch in width.

The large veins, on the external surface of the stomach, were most of them moderately distended with blood, and the ramifications went to considerable minuteness, and were most apparent in the smaller curvature. The whole of the intestinal canal was minutely injected with blood, which was, for the most part, of a dark crimson, or purple, but here and there, of a florid hue.

The stomach had no remains of food in it; but it contained much thick mucus, which adhered to the whole inner coat. There were florid patches of vascularity in various parts of the whole inner surface of the stomach; which were most remarkable in the posterior part, towards the left side, and in the lesser curvature, for about two inches from the cardia. The general character of the vascular appearance, was similar to that mentioned in the case of Nicholson.

CASE IV.

John Denton, aged 45, was executed at the Old Bailey, on Monday Sept. 20, 1813, at eight o'clock in the forenoon, and was opened in my presence, and the stomach examined by me, at twelve o'clock at noon of the same day.

The small intestines were very vascular, but the colon was free from any appearance of vessels; and the stomach was not unusually vascular in its external surface. There was a strong contraction, at about one third of the distance between the pylorus and the left extremity of the stomach, making a very well marked separation between the pyloric and cardiac portions. Several ounces of coffee-coloured fluid were found in the stomach. Plicæ were diffused over every part of its inner surface, except for about an inch and a half round the cardia: they were very much contracted at the place mentioned as separating the pyloric and cardiac portions.

The colour of the villous coat throughout was of a light crimson, varying slightly, however, in degree of brightness; sometimes being almost florid, and sometimes rather dark. Here and there, portions of a light straw colour occurred in streaks; but in these streaks very minute vascularity might be discovered by the naked eye, and better by a glass. The redness consisted of minute vessels, which rose up nearly to the surface of the villous coat, and diverged in still smaller branches, ending sometimes in a minute point, as if of extra-

vasation, which was rather darker than the vessels, but incapable of being wiped off.

In a very few places, there lay attached to the villous coat, with mucus adhering to it, a small portion of blood, which, with the mucus, easily separated, and left beneath a slight appearance of vascularity, but not more considerable than in most other places. A similar deposit of a portion of blood, occurred, in a slight degree, in a small portion of the duodenum which was removed with the stomach; but here the vessels were more continuous, and could be more readily traced along the villous coat. No difference of appearance occurred between the anterior and posterior part of the stomach.

CASE V.

James Leary, aged 42, was executed at the Old Bailey on Monday, Sept. 20, 1813, at eight o'clock in the forenoon, and the stomach was examined by me, the following morning, at half past eleven. About an ounce of thick dark-coloured mucus was found in it, which barely gave a red colour to water. Its inner surface was every where covered with plicæ, except for a short space around the cardia, and the whole presented an irregular mixture of straw-coloured and red lines; the red lines, for the most part, at the extremity of the plicæ, but not regularly so. The colour was generally of a florid hue, except where it dipped down between the plicæ; and there it was crimson. Around the pylorus there was an irregular ring, of about an inch in width, of more continued vascularity. The redness was sometimes in the form of distinct vessels, and sometimes of extravasated points; but the vascularity was less minute than in the case of Dutton, and had more the character of that of Nicholson. The colour of the whole was much darker on the Wednesday morning.

From the statements which I have given, it may, I think, be fairly inferred, that, in the villous coat of the stomach, appearances of vascular fulness, whether florid or dark-coloured, in distinct vessels, or in extravasations of various sizes, are not to be regarded as unequivocal marks of disease. They occur in every variety of degree and character, under every circumstance of previous indisposition, and in situations where the most healthy aspect of an organ might be fairly expected. They are found in every part of the stomach, but principally in the posterior part of the great end, and in the lesser curvature; and they cover spaces of various extent, but are generally well defined, and terminate abruptly.—These circumstances have been confirmed by a great number of other examinations, which I have, at various times, had occasion to make; and I am inclined to think, that the first series of cases, may therefore be regarded as a fair average of the appearances seen in the adult human stomach. In young subjects, I should imagine, there is in general little vascularity seen after death; for in the 16th case*, (that of a young man of 22,) there was none apparent; and of the bodies of two boys, which I have since examined, one, where death was produced by an abscess, exhibited a very obscure portion; and the other, where the cause of death was a fracture of the occipital bone, showed none.†

The appearances which I have described, preserve their distinctness for a short time only, being best marked on the first day, and soon after, but at irregular periods, becoming more obscure; the parts which were vascular acquiring a dark red, or purple tinge, which loses itself gradually. This effect more readily takes place when the villous coat is in contact with a fluid, particularly water. They exist in the body of the

* In the last case, the whole surface of the small intestines was covered with small florid vessels, generally giving the appearance of small transverse parallel streaks.

† Vide Table, p. 7.

villous coat, and in general appear to be greatest, where that membrane is the least firm and resisting. Careful dissection discovers a fine net-work of veins between the villous and the muscular coat, from which the minute vascularity of the former evidently proceeds. This is very often capable of being traced, through the semi-transparent mucous coat, into larger veins beneath, by gently stretching the mucous coat, so as to render it thinner. The arteries are always empty, or very nearly so.

The vascularity now mentioned, often possesses a starred appearance, from the circumstance of its spreading in minute vessels, continually ramifying into smaller ones, to very near the extremity of the villous surface. A slight degree of friction, with the point of a scalpel, will open the minute extremities of the vessels; but I have never observed, that even by squeezing the larger branches, in a retrograde way, effusion into the cavity of the stomach could be produced, so as to stain a white substance which might be applied to the villous surface.

An appearance, very similar to the vascularity now described, is easily produced by injecting the veins (when there happens to be but little blood in them) with red-coloured injection; in which case, the villous coat, to the naked eye, but still more when a magnifying glass of moderate power is employed, exhibits a branched, or slightly stellated form of vessels, so descriptive of those which are seen in the human stomach.* If the veins, when injected, contain blood, the blood is forced, by the injection, into more remote branches, and at last escapes by rupture.—An appearance, a good deal like this, also takes place by injecting the arteries; but the vascularity

* Isinglass, or calves foot jelly, rubbed up with a proper quantity of colouring material, was the injection employed. It was thrown in through a pipe fixed on the coronary artery or vein, by a syringe, which contained about an ounce. The stomach was inverted, the pyloric extremity tied, and the pipe brought out at the cardia, which was slightly enlarged, if necessary, and a ligature (as far as the pipes would admit,) placed on it. By this means, the flowing of the injection through the villous coat was kept under view.

now mentioned can be completely imitated, by forcing back with the finger, or the back of a scalpel, the blood from the larger branches of veins into the smaller ones, by which means a species of minute injection into the very extremity of the villous coat, most readily takes place. Where a few larger veins have been apparent, this effect can be produced without the least extravasation, to a considerable extent; more particularly when the coats are thin.

I have never been able to produce, satisfactorily, a passage of injection from the artery to the vein; either in the stomach or intestines. The termination of the artery in the vein, must be very remote in the villous covering; for when these vessels are filled by injections of different colours, they are found to run, side by side, as far as they are capable of being traced.

There is a very remarkable similarity in the appearances exhibited in the stomachs of each of the malefactors, whose cases are mentioned above; and a general resemblance apparent between them, and the stomachs of persons who have died of natural death. In the former, however, the vascular character is more universal, and more vivid; and there is, besides, a disposition to effusion of blood into the cavity of the stomach, which does not occur in the latter. These differences may readily be accounted for, by the circumstances in which the vascular system is placed, before the total cessation of life, in persons who die by hanging; for in them, the usual disposition to vascular fulness in the stomach, is increased by the loading of the venous system, which occurs in consequence of the difficult transmission of blood, from the right side of the heart, during suspension.

In considering the state of an organ after death, with reference to the circumstances under which it may have appeared during life, it is necessary to consider, that in the latter case, both systems of vessels are filled with blood; while, in the former, blood is found in the veins only, the arteries being nearly,

if not entirely empty.* It is likewise important to remark, that it is not from injections, that we can form any opinion as to the colour of parts, or the state of their circulation during life. Coarse injections will fill only large vessels; while fine injections will exhibit those which, like the vessels of the eye, are incapable, from their minuteness, of conveying red blood in the healthy subject. There is, besides, a considerable difference between the uniform colour of a living part, where the finest glass can discover no separation of vessels, and the vascular distinctness produced by injection.

These circumstances apply strongly to any deductions which we may endeavour to make, as to the usual state of the mucous coat of the stomach during life, from its appearance after death. It is, indeed, extremely difficult to form an adequate conclusion as to this point, and authors have given various opinions relative to it. By some it has been stated to be white;† by others to be reddish;‡ by others to be greyish, bordering upon yellow and red;§ clay-coloured or reddish;‖ or strongly marked red.¶

I have frequently seen the human stomach soon after death, and in such parts of it as were free from vascularity, it had usually a light straw-coloured tinge:** but, from the analogy

* ——"et a morte semper, arteriæ magis et magis inaniuntur, furtim et sensim, donec penitus albæ, et absque vestigio sanguinis sint, unaque cum membranis mesenterii pelluceant, a quibus non facillime distinguuntur." HALLER's Opera Minora, tom. I. p. 200.

If any blood were contained in the minute arteries, it would be extravasated in injecting them, which I have never seen to occur with the arteries of the stomach, though it sometimes happens, as I have already stated, with the veins.

† DUMAS, Principes de Physiologie, tom. iv. p. 241.

‡ CUVIER's Leçons d'Anatomie comparée, tom. iii. p. 353.

§ BOYER's Traité complet d'Anatomie, tom. iv. p. 337.

‖ SŒMMERING de corporis humani fabrica, tom. vi. p. 220.

¶ BICHAT, Traité des Membranes, p. 44.

** In dogs which have been hung, I have seen it with a slight crimson blush nearly over its whole surface, which is most apparent at the plicæ, and

of the mucous covering of the mouth and fauces, and of the urethra, it is probable, that when circulation is going on in the stomach, its inner surface is of a pale red hue, arising from vessels so minute as to give an uniform colour, without any appearance of distinct vascularity.* After death, the arteries and minuter veins are almost wholly emptied of their contents, and thus the colour of the villous coat is removed; but by dissection it will generally be found, that fine vessels are discoverable in the cellular membrane, which is interposed between the villous coat and the muscular. The removal of the colour, if we may judge from the analogy of the mucous membrane of the mouth, takes place very speedily.

It is difficult to ascertain in what way vascular appearances, such as those described by me, originate. That they take place about the close of life, is highly probable; but I feel myself unable satisfactorily to account for the mode in which they are produced. They are wholly venous, as is also the vascularity seen in many other parts of the body after death; the arteries, to which the veins which are so distended, correspond, being generally empty. It would therefore appear, that there is a power capable of being exercised in the artery itself, which carries on the blood to the capillaries, or to the veins, after the further supply of fresh blood from the heart is stopped; and that there is thus a species of accumulation pro-

seems to consist of minute crimson points formed as if by the projection of minute straw-coloured villi on a red surface. This appearance, I apprehend, is in some degree dependent on the mode of death. In pigs, I have always seen it of a light straw colour, with a slight crimson blush over a part of its surface.

‖ The colour of the villous coat of the stomach and intestines is much alike in the dead body; being in both a light straw colour. Bichat states generally, that the natural appearance of the former, (meaning of course in the living body,) is a strongly marked red; and he gives an instance of a wounded and inverted portion of intestine, in which there was the redness, 'qui caracterise cette surface dans l'etat naturel.'

duced in the veins, which is adequate to the production of the phenomena in question.*

In men who have been hanged, there is an obvious cause of accumulation in the veins; and the same cause seems to act, in a smaller degree, in cases of ordinary death. It operates also, in death by drowning; but I have had no opportunity of ascertaining whether, in this case, the same appearance of stomach is produced, as in suspension. The striking vascularity so often observable in that organ after death, in consequence of venous accumulation, seems to be, in a great measure, referable to the peculiar laxity of the medium in which its blood vessels are placed, and to the great number with which it is supplied. Hence, likewise, the disposition which it exhibits to effusion of blood, as well during life as in death, from suspension.

The different degrees of colour, from dark purple to florid, which I have noticed as being seen in the vessels of the villous coat of the stomach, appear likewise occasionally in the veins of the mesentery and intestines. They afford examples of arterial hue, or a certain portion of it, continuing in blood, some time after the reflection of an artery into a vein. There are many facts which prove, that this change of arterial into venous blood may, under some circumstances, be accelerated or retarded in the living body; and Mr. Hunter has observed, that there is generally a palpable difference in the degree of darkness of venous blood, taken at different distances from its source in the arteries; for instance, at the hand, and the bend of the arm.†

The precise circumstances under which arterial colour is preserved after death, are not altogether known. The florid

* 'Etenim ubi cor sanguinem allatum in arterias promovere non amplius valet, illa vis (elastica) ad urgentem in venas sanguinem sufficit. At si vis ista elastica simul cum vita perditus v. c. arteria in os mutatur, arteria quoque post mortem sanguine plena conspicitur.'

SŒMMERING De Corporis Humani Fabrica, tom. 5. p. 64.

† HUNTER's Treatise on the Blood, Inflammation and Gun-shot Wounds, p. 69.

hue seems to be an exception to that in which blood usually appears in the dead body; for there the arteries, (when they are not empty) as well as the veins, contain dark blood. This change from the proper colour of the blood contained in the arteries, is supposed, by M. Bichat†, to take place before death; for he is of opinion, that in most instances, for some little time previously to the extinction of life, the whole of the blood which circulates through the body, is dark; and that, where any surface after death is found to be florid, (and he instances the mucous membrane of the nasal fossæ as being occasionally so) it has continued in that state by means of its capillaries, which he conceives are not easily affected by changes which may have taken place in the circulation of larger vessels.

This conclusion, with regard to the capillaries, would merely provide for their continuance in the state in which they existed during life; but it is hardly reconcileable with the enlargement which, after death, is so palpably seen to have taken place in them, in the human stomach. Such enlargement can scarcely have been produced, except by a force sufficient to overcome the resistance made by the parietes of these minute vessels to the augmentation of blood; and for this force, it is difficult to look except to the arteries; particularly as those of middle and smaller size are, after death, found to be freed from blood. In this case, however, the blood last projected, might, if dark, have been expected to impart to such capillaries, a dark, instead of a light colour; which, in many instances, it has been seen, is not the fact.

The change from florid to dark coloured, or from dark to darker red, which, as I have observed, takes place in the colour of the minute vessels of the stomach, in the course of a short time, is in some degree analogous to that change, which Mr. Hunter has observed to occur, by rest, in the colour of arterial blood, whether contained in aneurismal sacs, in cellu-

† Anatomie Générale, tom. 2.

lar membrane in consequence of extravasation from wounded arteries, or in the brain after apoplexy.*

The diffused redness, to which I have stated that the distinct vascularity of the villous coat soon gives place, occurs in a longer or shorter time, without any obvious cause for such difference. It seems to be the effect of transudation from the coats of the containing vessels; for I have seen, on inverting a vascular stomach, extending it upon a flat surface, and keeping it moist and undisturbed, that a blush is communicated from both larger and smaller veins to the contiguous cellular membrane, which very gradually increases in extent: while such parts of the villous coat as possess minute vascularity, lose it under such circumstances; the interstices becoming coloured by the transuding fluid, so as to give the whole of the surface an uniform crimson or purple tinge. The effect mentioned, I have observed to commence, in a recent stomach, in the course of a day, or a day and half, but sooner in one which is less recent, though not at all putrid. Putrefaction will doubtless increase, but it does not seem at all necessary to transudation.—This diffusion of colour is, therefore, analogous to the transudation of the bile from the gall bladder, which is so very generally observed in the examination of bodies.†

The slight resistance which dead matter is able to give to a contained fluid, is proved (if more proof than what the gall-bladder affords is necessary) by the employment of any two fluids, which are nice tests of the presence of each other. Thus, in a portion of inflated recent intestine, when the mesenteric arteries are carefully injected with solution of prussiat of pot-

* Hunter, l. c. p. 65.

† Haller refers an appearance of transudation from the intestinal vessels of a female who died of erysipelas in the leg, to inflammation, though there is every reason to suppose that it occurred after death. "Intestina flatu insigniter distenta, tota inflammata erant, non quod vascula unice distenderentur, sed quod cruor secundum totam longitudinem arbuscularum vasculosarum in cellulositatem effusus, lineam obscure rubentem, in vasis circumpositam efficeret."—*Opera minora*, tom. iii. p. 349, obs. 53.

ash, and the veins with solution of green sulphat of iron, no effect is perceptible for a short period; but very soon the blue colour is produced, in the whole course of both systems of vessels, to considerable minuteness, and at the same time. If the carotid artery, or a portion of intestine (both of them recent) be filled with either of those fluids, and tied, and the centre be made to dip into a small vessel containing a portion of the other fluid, it becomes very speedily tinged with blue precipitate, at the place of contact.

Are circumstances of vascularity affected by thinness of coats?—The coats of the stomach vary very much in thickness in their different parts; the whole substance being sometimes so thin at the great end, as readily to admit of making out through it, dark figures on a light surface. In one case of this kind, the weight of two oval portions of similar size varied about three fourths: the portion taken from the fundus amounting to $5\frac{1}{8}$ grains, while that taken from a part about midway to the pylorus (where this stomach seemed to be thickest) amounted to $22\frac{1}{4}$ grains. This stomach admitted the injection of its arteries close to the part where a ligature had been placed round the oval orifice, without extravasation; and another stomach allowed the injection to pass, with the same success, over a portion, which, to judge by figures seen through it, was equally thin.

The veins, likewise, when pressed backwards, minutely injected their smaller branches, just as has been described to take place, in ordinary circumstances of venous turgescence, without any effusion being produced into the cavity of the stomach; for the blood, in the minutest extremities of these vessels, was incapable of being wiped off, or of giving any tinge to a white surface applied to the villous coat in which they terminated. This last mentioned circumstance, I have likewise frequently remarked, in cases where the great end of the stomach was nearly as thin, as in the stomachs above mentioned, if not equally so. Where there was, however, the slightest cut

in the villous surface, the vessels were divided, and consequently effusion took place.

The difference of thickness which occurs between different parts of the same stomach, is produced by variations both in its villous and muscular coats; for I found that of two equal oval portions of the same stomach, one of which was taken at the great end, and the other near the pylorus, in the lesser curvature, the former, weighing six grains, had its villous coat consisting of $2\frac{1}{2}$ grains, and the peritoneal and muscular together of $3\frac{1}{2}$ grains; while the latter, weighing $19\frac{1}{2}$ grains, had its villous coat consisting of seven grains, and its peritoneal and muscular together, of $12\frac{1}{2}$ grains.* The thickness of the peritoneal coat appears to be pretty uniform; but that of the muscular and villous to vary, not only in different stomachs,

* It may be proper to mention, that the weight of the villous, and of the peritoneal and muscular coats of nine similar oval portions of this stomach, was taken with some care, the dissection being made after separation from the stomach. In three other similar portions, the peritoneal and muscular coats alone were taken, the villous having been dissected off previously to removal. The following are the weights in grains, viz.

Villous coat -	$2\frac{1}{2}$	$4\frac{1}{2}$	5	$5\frac{1}{2}$	$8\frac{1}{2}$	$7\frac{1}{2}$	$7\frac{3}{4}$	$7\frac{1}{2}$	7			
Peritoneal and muscular together.	$3\frac{1}{2}$	2 3	$3\frac{1}{2}$	$7\frac{1}{2}$	$6\frac{1}{2}$	$8\frac{1}{2}$	$8\frac{1}{2}$	9	$12\frac{1}{2}$	$3\frac{3}{4}$	$11\frac{1}{4}$	$17\frac{1}{2}$
	6	$7\frac{1}{4}$	$8\frac{1}{2}$	13	15	16	$16\frac{1}{4}$	$16\frac{1}{2}$	$19\frac{1}{2}$			

The thinnest portions were from the great end, the others from different other parts of the stomach, but the thickest were taken near the pylorus, particularly the heaviest portion ($17\frac{1}{2}$). The mucous coat had been dissected from this portion before it was taken out, so that the united weight was not known; but it could not be less than twenty-four grains.—It is obvious that there are various sources of error in ascertaining, very correctly, the weight of such soft and yielding parts which are to be separated in equal portions. That there is a considerable difference in the quantity and proportion of each coat, in different parts of the same stomach, seems to be all that it is of any consequence to know.

I should imagine that it is but seldom there is so much disparity between the thickness of different portions of the same stomach. The great end is not unfrequently extremely thin.

and in different parts of the same stomach, but in relative proportion in such different parts.

Mr. HUNTER, in his valuable paper on digestion after death, makes some observations relative to the great end of the stomach, to which, as being intimately connected with the subject of this paper, it is necessary that I should advert.

"There are few dead bodies," he remarks, "in which the stomach, at its great end, is not in some degree digested; and one who is acquainted with dissections, will easily trace these gradations. To be sensible of this effect, nothing more is necessary than to compare the inner surface of the great end of the stomach, with any other part of its inner surface; the sound portions will appear soft, spongy, and granulated, and without distinct blood vessels, opake and thick; while the others will appear smooth, thin, and more transparent; and the vessels will be seen, ramifying in its substance; and upon squeezing the blood which they contain, from the larger branches to the smaller, it will be found to pass out at the digested ends of the vessels, and to appear like drops on the inner surface."* These effects, he attributes to digestion, by the gastric juice, in the ducts of the glands which secrete it.

With every respect for the high authority of a gentleman to whom the professional world is so much indebted, I shall state to the society, the circumstances in which my own observations have not agreed with those of Mr. HUNTER, as to some of the points mentioned in the quotation just given.

The great end of the stomach certainly appears, in general, to be smoother, thinner, and more transparent than the other parts; but its thinness does not apply to the *villous* coat alone; there is also, (as I have already shewn) a very great thinness of the *muscular* coat, at this place, which may equal, and sometimes exceed that of the former.

The instances which I have mentioned above, afford striking examples of thinness in the coats of the stomach at its

* HUNTER's Observations on certain Parts of the Animal Economy, p. 226.

great end; but that this thinness originated in erosion of the villous coat by the gastric juice, appears to me to be very doubtful; because it is difficult to conceive, how this effect could occur, without being accompanied by an erosion of the ends of the arteries, and consequent extravasation on attempting to inject them: but yet, in the cases which I have stated, where the substance of the stomach was in the extreme of thinness, no extravasation took place when the arteries were injected. In those cases likewise, the venous blood, on forcing it backwards, filled minute vessels, but was not extravasated.

I can hardly indeed conceive, that if the great end of the stomach were, in ordinary circumstances, eroded by the powers of the gastric juice, we should be able, with any degree of certainty (as we assuredly are), to fill its vessels by injection; unless we could suppose, that the vessels were left unaffected in the solvent operation. Mr. HUNTER was quite aware that the gastric juice, in diminishing the thickness of the villous coat, must digest the ends of vessels; for he gives as a proof of digestion of the stomach taking place, that blood, when forced from larger branches into smaller ones, passed out at the digested ends of vessels, and appeared like drops on the inner surface. Such a degree of digestion, however, must, I venture to suggest, be very rare; for in the many trials which I have made as to this point, particularly where the stomach was exceedingly thin, it has never happened to me to be able to do more, than fill the minute extremities of the veins, (in the way which I have already mentioned) by pressing the blood backwards in the larger branches. These minute extremities are easily ruptured, in injecting the veins; and if a sufficient body of blood could be forced back from the trunks into them, (which can scarcely be the case) it is most likely that the same effect would follow.

Mr. HUNTER seems to refer the vascular appearance, seen in the inner surface of the stomach, to thinness of the villous coat; meaning, I presume, to imply, that the vessels are generally in a state to be visible, provided a certain portion of the

villous surface by which they are covered, or in which they are imbedded, were removed from them. This, however, does not appear to me to be the case; for the visibility of vessels, as far as I am able to judge, arises, in a considerable degree, from the accidental circumstance of blood being contained in them, without which, they would be difficultly seen at all*; and the possession of blood, seems to me to be in a great degree independent of the state of the coats as to thickness.

It by no means follows, because large veins are frequently seen ramifying under the villous coat of the great end of the stomach, (when this is thin, and therefore admits them to be seen through it) that a similar vascular appearance will be seen in other parts of that viscus, by dissecting off the whole, or a part only of the mucous coat which lines it.

The nature of that vascularity which is so generally seen in the villous coat of the stomach, seems to have been very much misunderstood among authors, even of high eminence.

HOFFMAN has a chapter entitled, "de inflammatione ventriculi frequentissima," in which he expresses his surprise, that a complaint so common, as he found inflammation of the stomach to be, should have been so little observed; and he points out as indications of this disease, appearances very similar to such as are mentioned in this paper, to be of usual occurrence.† He admits the existence of similar appearances,

* The term vessels, employed by Mr. HUNTER, can only apply to veins, the arteries being always empty, except perhaps in a portion of their trunks. If blood is not contained in the veins of the stomach, even the trunks of those veins are discovered with very great difficulty. The arteries may generally be traced by their size, while they run between the peritoneal and muscular coats, which is the first part of their course in the stomach; but in the small branches, they are seldom, in their usual state, to be seen or felt.

† "In corporibus dissectis, ventriculus valde rubicundus, variis modo rubris, modo nigris maculis distinctus, vasaque sanguinea et capillaria multo sanguine turgida reperiuntur; quandoque orificium sinistrum macula lata nigra notatum visitur."—"Non totus vero ventriculus semper, sed pars saltem, maximè vero fundus, inflammatur." HOFFMANNI Opera, tom. 6. p. 224.

in plague and various fevers; but in the former, he attributes their occurrence to a species of poisonous miasma, inhaled by the breath, which produces spasm, and by this means, inflammation of the stomach.

DE HAEN* and STOLL† give examples of what they regard to be inflammation of the stomach, terminating in gangrene, without having exhibited any of the usual symptoms of gastritis; and the former recommends this occurrence, as a very remarkable and puzzling one, to be added to his chapter of Problemata et Difficultates.

SELLE, in his Pyretologia‡, refers to DE HAEN, as affording a modification of the usual definitions of gastritis; and CULLEN seems also to have depended on the authority of the same author, when he states, "that it appears from dissections, that the stomach has often been affected with inflammation, when neither pain nor pyrexia had before given any notice of it."§

PORTAL, in speaking of the great vascularity of the stomach, says, that by means of the slightest turgescence of the vessels of the stomach, particularly the veins, the villous coat becomes dark; an effect so common, that this black colour ought to be regarded as *a mark of inflammation*, rather than poison.‖

* "Nec minus mirabilis ventriculi, et obstructi, et perquam inflammati, et gangrænosi, contemplatio, ubi ad mortem ferè usque, nec signa febris, aut gangrænæ in pulsu, nec signa doloris in hoc viscere, nec signa alicujus in ejusdem functione defectus, apparuerint." DE HAEN's Ratio Medendi, pars 6, cap. 12, § 2.

† — "ventriculus ingens" ——— "cujus posterior facies longè latèque ex inflammatione"—"rubebat"———"En hic quoque ventriculum inflammatum, absque consuetis et manifestioribus inflammationis signis. Intestina livida, vel absque prægressa inflammatione fuerunt, vel prægressa est inflammatio absque ejusdem signis." STOLL's Ratio Medendi, tom. 3. p. 380.

‡ SELLE's Rudimenta Pyretologiæ Methodicæ, p. 139.

§ CULLEN's First Lines of the Practice of Physic, vol. i. p. 420.

‖ PORTAL's Cours d'Anatomie Medicale, tom. 5. p. 164. He adds, "Dans quelques cadavres, on ne trouve ce viscere inflammé, *que dans quelques points*, comme vers le cardia, vers le pylore, souvent dans la grande courbure de

FRANK states frequency of inflammation of the stomach, and enumerates its symptoms: but he admits, that in many instances, where inflammation was found in the stomach after death, most of those symptoms were absent; in others, where the greater part of the symptoms were present, that no mark of inflammation was to be discovered on dissection; and in others, that a similar train of symptoms was removed, by means which were adverse to inflammatory complaints.*—I am likewise inclined to think, that vascularity of, and extravasation into, the villous coat of the stomach, as well as external vascularity of the intestines, particularly when these appearances are dark-coloured, have been occasionally described as inflammation or gangrene, even by MORGAGNI and LIEUTAUD, two of the highest authorities in pathology.†

ce viscere, ou ailleurs; d'autrefois les parois de l'estomac sont inflammées dans toute leur etendue." Tom. 5. p. 194.

* " Non infrequens stomachi humani morbus est *gastritis*, aut ejusdem inflammatio; cujus quidem signa principalia in febre acuta, in epigastrii tensione, ardore, dolore, in vomituritione, anxietate, singultu, ab assumptis quibusvis mox, et cum subitanea istorum rejectione, adauctis consistunt: sed in multis, qui ventriculi post mortem phlogosin obtulere, nunc plurima ex istis defuerunt; nunc, cum pars major symptomatum in ægrotante comparuisset, vel in cadavere inflammationis ad ventriculum in vanum quærebantur vestigia; vel ab aliis causis dictorum effectuum pependerat cohors, ac a medendi methodo, inflammationis certe contraria, potuit dissipari."—FRANK (J. P.) *De curandis hominum morbis epitome*, lib. 2. p. 253.

† " Ventriculi fundus atro colore;" " ventriculus intus inflammatus, minimisque vasculis multum sanguine turgentibus;" " ex atro (ilii partes) rubebant, sanguiferis vasis, non secus ac post injectam coloratam ceram, manifestissimis," are examples of the mode of description frequent in Morgagni's valuable work.—In one instance, (epist. 29. art 29.) the absence of pain in inflammation of the bowels, is attributed to a paralytic affection, which took off the sensibility of the parts; and from other cases MORGAGNI deduces the inference, that pain and fever are not necessary for the existence of inflammation of the intestines. His words are, (epist. 35. art. 21.) " Nec tamen, siquando alterum vel utrumque horum" (nempe vehementem dolorem, vel acutam febrem) " aut abesse, aut vix esse invenies, continuò putabis, aut nullam esse inflammationem, aut levem, aut gangrænam et sphacelum in eorum esse intestinis non posse, in quibus duo illa præcessisse non videris."

HALLER also seems to regard fulness of vessels as a proof of inflammation; for he states, that he has so often, in his dissections, seen inflammation of the intestines present, as to consider such an affection as almost constant in every kind of fever, and frequent in every other complaint.* Numerous examples of the same opinion are to be found in other respectable authors.

The importance of distinguishing between darkness of colour, and proper inflammation, or its effects, was noticed at a a very early period by HABICOT, a French surgeon of eminence in his time, who states, that persons are often deceived into a belief, that the dark colour produced by the gastro epiploic vein, in the greater curvature of the stomach, is the effect of poison.†

* HALLER's Elementa Physiologiæ, tom. 7. p. 43.

Most of the cases of inflamed stomach noticed by LIEUTAUD are taken from other authors. One of them (Historia Anatomica Medica, tom. i. p. 26. obs. 68.) is abridged from HALLER's Opera Minora, tom. 3. p. 295, and seems to me to shew how loosely inflammation of the stomach has been put down among diseased appearances. It is the case of a person, in whom, though there had been no affection of the stomach during life, that organ was found, on examination, to be universally inflamed, and blood effused into some parts of its cellular substance. The patient was a man of 50, who had recovered from an attack of pleurisy, but remained very liable to pectoral complaints. From exposure to cold, he was seized with a violent fever, with pain and oppression in the chest, which were followed by hiccup, delirium on the 8th day, and death on the 12th.—See some judicious observations on the differences between inflammation and vascular fulness in membranes, in HUNTER on the Blood, p. 281.

† "La partie interieure d'iceluy vētricule estāt nettoyée demōstrerez, tant la tunique interne qui est veloutee, et comme l'aboutissemēt qui se faict des vaisseaux provenās de la vene gastre epiploïque en la partie gibbe dudict ventricule, le rend de couleur noirastre, qui a faict croire à beaucoup d'inexpers, en la medicine et chirurgie, aux maladies violentes y avoir eu poison ou venosité en leur mort."—HABICOT NICOLAS, Semaine ou Practique Anatomique, p. 48, leçon 3, Paris, 1610.

BOYER makes nearly a similar remark: "Le grand nombre de vaisseaux qui se distribuent dans cette tunique (la veloutée) lui donne souvent une couleur pourpré obscur; c'est a quoi il faut faire la plus grande attention

The means of forming a satisfactory conclusion in cases of suspected poison, obviously connect themselves with the proofs, which dissection is capable of affording, of the existence of inflammation in the stomach during life. There are no circumstances under which medical men have a more serious and anxious responsibility, than in the examinations which they are called upon to make in such description of cases; for while, on the one hand, public justice demands from them an unequivocal avowal of the results of their judgment and experience, for the conviction of guilt; it is equally required, that their opinions should be founded on an accurate knowledge of what are the effects of natural causes on the human body, and what the consequences of deleterious operation. The most able and experienced men have found difficulties in making up their minds as to the necessary effects of poisons; and it would be highly important, both for the interests of the public, and the credit of the profession, that the means should be afforded of directing the judgment, in those delicate and difficult problems, on which medical testimony is occasionally required in courts of justice.*

Authors on Forensic medicine have been too apt to generalize, without having had the benefit of studying, sufficiently, individual cases; and hence the effects of putrefaction, and the spontaneous changes which the loss of vitality produces on the human body, have, in descriptions, it is to be feared, been sometimes misunderstood, and sometimes confounded with the proper and necessary operation of poisons.

lorsqu'on est chargé de faire l'examen des corps de personnes que l'on soupçonne mortes de poison."—Traité complet d'anatomie, tom. 4, p. 337.

* I allude more particularly to the hesitation which Mr. HUNTER had, in the celebrated trial of CAPT. DONNELLAN, in distinguishing between the effects of poison and the effects of putrefaction.

A report of this important trial was published by Mr. Gurney, at length, from the account taken by him in short hand. A full abstract is to be found in the Gentleman's Magazine for 1781, and in the London Chronicle for March of that year.

Some of the most respectable writers on this subject, have represented the effects produced by poisons on the stomach, œsophagus and intestines, to consist in diminished cohesion, inflammation, mortification, erosion, and perforation of those organs:* but later and more particular observation seems to evince, that the only morbid change which may be invariably expected, is inflammation; for the others are either occasional only in their occurrence, or equivocal in their nature; as in the case of mortification, or gangrene, which may be assumed to exist, from mere darkness of colour. Mortification and gangrene, are rare occurrences in either the stomach or the bowels; and they are not noticed by Dr. Baillie, in his Morbid Anatomy, as belonging to the usual effects of mineral poisons, nor by Mr. Brodie,† nor Dr. Jaegar,‡ both of whom have attended very much to the operation of those substances.

I may add, that in a case of poison by arsenic, which I saw some years ago, there was no diminution of natural tenacity, which is the only certain test of a part being mortified; and no

* Mais ce qu'il y a de constant dans les cadavres des personnes qui ont péri d'un poison àcre ou caustique, c'est de trouver l'œsophage, l'estomac et les intestins grêles atténués, enflammés, gangrenés, rongés et souvent percés.

MAHON's Medicine Legale, tom. ii. p. 308.

PLENCK, in his Toxicologia, page 13, says that we may distinguish when a person has been destroyed by poison, "si in tali cadavere ventriculus inflatus vel spasmodicè contractus, aut inflammatus, vel gangrænosus, vel saltem, maculatus inveniatur, absque alia prægressi prius morbi causa."

Dr. PARR states, that when "stimulant poisons have been the cause of death, the abdomen is greatly inflated, becomes rapidly putrid, dark spots appear on the body, erosion, inflammation and gangrene are found in the fauces and stomach, the blood is black, and collected in the veins; above all, the villous coat of the stomach is destroyed."

Medical Dictionary, art. Medicina Forensis et Politica.

† Further experiments and observations on the action of poisons on the animal system.

Philosophical Transactions for 1812, part ii. p. 210.

‡ Dissertatio Inauguralis de effectibus arsenici in varios organismos, necnon de indiciis quibusdam veneficii ab arsenico illati.

Edinburgh Medical and Surgical Journal, Jan. 1811, vol. vii.

circumstance from which gangrene could be inferred, but the very insufficient one of darkness of colour.*

Neither is the disposition to putrefy, in such cases, materially different, (as is generally imagined) from what it is in ordinary circumstances: and that erosions very rarely happen, and are sometimes liable to be suspected, when they do not exist, is rendered probable, by the consideration of the facts brought forward by the two last named gentlemen.

But if it be admitted, that the only constant and necessary primary effect of mineral poisons on the human stomach, is the production of inflammation, it is important to inquire, whether such appearances of inflammation are so distinctly and unequivocally marked, as to be readily distinguishable from mere vascular fulness, or slight extravasation, as described in this paper?

To this question, I fear, that an answer, which is completely satisfactory, cannot at present be given.

Dr. BAILLIE states, that in inflammation of the stomach, that organ is "a little thicker at the inflamed part, the inner membrane is very red, from the number of small florid vessels, and there are frequent spots of extravasated blood, which appearances are more intense, when arsenic has been swallowed." With this account, Mr. BRODIE's observations, in considerable measure agree.

In a dog which had taken several grains of corrosive sublimate, and which was destroyed a few hours afterwards, for the purpose of observing what might be regarded as appearances of recent inflammation in its stomach, the following were the principal circumstances remarked.†

* Case published in the Edinburgh Medical and Surgical Journal for October, 1809. It is remarkable, that in this case, there was reason to suppose, that the patient had suffered little or no pain,—and in the only example which Dr. JAEGAR saw of death by arsenic, in the human subject, there was no complaint of pain, even when the patient was asked about it.

† This dog I examined with Mr. Lawrence, Assistant Surgeon to St. Bartholomew's Hospital. The dog had vomited considerably. He was di-

That part of the stomach which extended from the cardia, about an inch and a half along the lesser curvature, and about three parts of an inch in every other direction, together with a few other portions of a very small extent, possessed a pretty deep crimson hue; while the pyloric portion was of a light straw colour, and the other parts of a greyish pink. The crimson colour, though deeper, had, in other respects, very much the character of what was mentioned in the note to page 16; but it was mixed with darker coloured patches, which seemed, on inspection, to consist of coagulated effusion, or coloured coagulum, in the substance of the villous coat, very similar to that which is sometimes found in an inflamed serous membrane, on which coagulable lymph had been very recently deposited. The plicæ were numerous and firm; there was little external vascularity; and below the villous coat, there were some minute veins perceptible, (particularly where the coat was reddest) which could not however be traced into its substance.

Immersion in water removed part of the general redness; but that of the dark patches remained, with little change, till putrefaction commenced.

The villous coat of the intestines had occasional patches of light crimson efflorescence.

It is highly important that appearances of inflammation in the stomach should be correctly distinguishable, after death, from those of mere vascular turgescence; but it does not appear to me, that the discrimination can at present be made with sufficient precision.—The following observations, I take the liberty to offer, as suggestions relative to this subject.

When the stomach is inflamed, coagulable lymph is occasionally thrown out in the substance of the villous coat, or upon its surface; and this, when it occurs, (which I believe to be

rected to be destroyed by a blow on the head, instead of by suspension, which would have affected the appearances, by producing unusual accumulation in the veins.

but rarely the case) is perhaps one of the least equivocal indications of previous inflammatory action. But thick mucus sometimes assumes a good deal the appearance of coagulable lymph; and the existence of a coloured coagulum, may occasionally be confounded with a coagulated portion of extravasated blood, adhering (as in the case of Nicholson) to the villous coat; which may the more readily occur, when the former is not in quantity, sufficiently great, to produce well marked thickening. It is also to be observed, that in cases where mineral poisons have been given, the deleterious operation (as appears from the experiments of Mr. Brodie) is generally upon the brain and nervous system; and in this case the inflammation, produced on the stomach itself may be short of that which would produce effusion of lymph.

It is exceedingly likely, that in inflammation of the stomach, the redness is less distinctly referable to vessels, and the florid colour more permanent, than in mere turgescence: but it is not to be forgotten, that it sometimes happens in cases of natural death, that the vascularity of that organ is partly florid and distinct, and partly diffused; circumstances which may create a little embarrassment, when they are to be considered with reference to a certain supposed cause.

In every case of death from poison, the appearances which dissection may offer, must be modified by the state of the blood-vessels after death, and by the very vascular nature of the stomach, and the disposition to accumulation in its veins, which occur at the close of life. We may therefore not unreasonably expect such venous accumulation to be often superadded to the proper and necessary effects of inflammation.

If well marked erosions were the frequent effects of severe inflammations, they would materially assist in forming a ground of discrimination. As Mr. Brodie and Dr. Jaegar, however, represent erosions to be very uncommon effects of arsenic, it is important, that the frequent thinness of the fundus of the stomach, and the occasional inequalities of the villous coat, either there, or in other parts of that viscus, should not be

mistaken for them. These inequalities are by no means unfrequent, and I have often seen them to a considerable degree, where they were unquestionably mere peculiarities of structure.

In judging of the existence of external inflammation in the living body, it is not by mere redness, or by turgescence of vessels, that the opinion is guided; but by those circumstances, in conjunction principally with pain, heat and swelling. It does not therefore appear to be less necessary, for the purpose of enabling us to judge of the existence of internal inflammation, that something unequivocal in the symptoms should be superadded to the appearances submitted to our consideration, than that there should be assistance required in judging of external affections, in addition to mere colour or vascularity.

But on the subject of symptoms, it is important to recollect, not only that genuine gastritis is extremely rare, but that affections of some neighbouring parts, which may sympathize much with the stomach, may be confounded with original affections of the stomach itself. This organ, too, is liable to many very painful or uncomfortable sensations, which there is no reason to consider as marking it with any particular character of disease.

In offering these remarks, I may, perhaps be regarded as having somewhat aggravated the difficulty of forming a judgment, after death, as to the existence of inflammation of the stomach during life. It does not appear to me, however, that I have done so; and I should be happy, if, by calling the attention of professional men to the subject, a more correct, and more practical diagnosis should be established, than is at present possessed, relative to the operation of inflammation in that organ, from whatever cause it may have proceeded.

Before I conclude this paper, it is necessary that I should advert to the appearances of inflammation, which are gene-

rally stated to be found in the stomachs of hydrophobic patients, and which have been, by many, thought to prove that hydrophobia is a species of gastritis.

I have seen five cases of hydrophobia, and have been present at the dissection of three of them; but I am unable to say, that there was any palpable difference, between the vascular appearance of the villous coat of the stomach in those cases, and that which is ordinarily seen, in the human subject, where there was no affection of the stomach during life.

In some of the cases which are upon record, the stomach is stated to have been entirely free from disease;* and most of the other examples to be found in authors, particularly those which are published in the Memoirs of the Royal Society of Medicine of Paris for 1783, and by Dr. Hunter, in the 1st volume of the Transactions of a Society for the Improvement of Medical and Chirurgical Knowledge, afford no appearances in that viscus, which are not referable to fulness of vessels only.

The appearances observed in the stomach of the dog, are rather more diversified. The principal number of cases reported, exhibit marks of redness and fulness, or slight extravasations of various extent, in the villous coat; but there are some mentioned, where this coat presented nothing morbid in its aspect.†

When we compare the descriptions given of the state of the stomach, in most of the cases of hydrophobia recorded as occurring in the human subject (for I do not take into account any extraordinary, or anomalous cases) with the series of dissections presented in this paper, the resemblances are striking, and certainly tend to throw some degree of doubt on the idea very commonly entertained, that the usual vascular appearance

* See VAUGHAN's Cases and Observations on Hydrophobia, Cases 1st and 3d.—Also two cases by Dr. BABINGTON, the first in Medical Communications, vol. I. p. 215; the second in Medical Records and Researches, p. 117; and several cases quoted in Hamilton's Work on Hydrophobia.

† GILMAN's Dissertation on the Bite of a Rabid Animal, sect. I. &c. &c.

observed in hydrophobic stomachs, is inflammation; and that it is connected with the production of the symptoms which existed during life. It is very difficult to conceive, that the cause of one of the most formidable and distressing maladies of the human body, can be such an affection of a part, as is, in many cases, so slight, as not to be an object of attention or remark at all; and in most, does not exceed what is very generally met with, where no symptoms, referable to disease of the stomach, or spasmodic affection of the œsophagus or pharynx, were present.

The appearances mentioned in some of the dissections given of dogs, deviate more from the character of simple turgescence, than most of those stated to have been observed in the human subject; inasmuch as there was frequently effusion of blood seen between the villous and muscular coat of the stomach, or in the substance of the former. The mere action of vomiting will, however, as I have in one case particularly observed, materially increase the redness to be seen, after death, in the stomach of a healthy dog. In attempting, therefore, to establish the pathology of this disease, it is important to discriminate between the effects of inflammation, and the influence which the violent spasmodic affection of the œsophagus and pharynx will have, not only upon the mucous membrane covering those parts, but upon the villous coat of the stomach itself, by being propagated downwards within the cardiac orifice. For it is very probable, that violent spasmodic action of muscles, may produce a well marked influence on a superincumbent mucous coat, particularly when such coat is extremely lax and vascular, as is that of the stomach.

With regard to the employment of blood-letting in hydrophobia, I would observe, that if its utility were even confirmed by the most irrefragable evidence, it would not be conclusive as to the inflammatory nature of this disease. The effects of this remedy are not to be limited to the mere removal of inflammation, or inflammatory disposition. It is not employed with this view in apoplexy, where it is often of the most de-

cided benefit; and there may be effects produced in the body, particularly on the nervous system, by the copious abstraction of blood, for which the present state of pathological knowledge is not qualified to account.

On the Muscularity of the Uterus.

By Charles Bell, Esq. F.R.S. Ed.; and Teacher of Anatomy in Great Windmill Street.

[From the London Medico-Chirurgical Transactions for 1813.]

As midwifery makes no part of my occupations, I intend, in this paper, to confine my attention to the anatomical structure of the womb; or to such points of the pathology as are directly connected with the anatomy. But some facts have been forced upon my observation which have not hitherto been laid distinctly before the public. They have induced me to resume the examination of the muscular structure of the womb; and comparing what I have seen in the dead body, with what I have observed in the living, I shall endeavour to lay a connected account of this subject before the Society.

I have dissected the gravid uterus in all conditions—in women who, in consequence of fever, had died undelivered; in women who had died from flooding; and in women who had died in consequence of distortion of the bones: I have had two opportunities of examining the uterus ruptured by its spontaneous action; and one, in which the uterus had been ruptured by violence; and, finally, I have examined the state of the uterus after death in consequence of the Cæsarian section.*

* I wish that my present subject permitted me also to state what I have found on dissecting the parts after the use of the crotchet, and in particular where the forceps had been used, as I must presume, in a case improper for them. The injury which the seeming harmless instrument, the forceps, is capable of doing might then be proved, and a wholesome admonition given to the young surgeons.

In this way I have been led to attend to this subject as an anatomist, rather than as an accoucheur; an explanation which, I fear, will seem very necessary in apology for these observations.

Of the Muscular Structure of the Uterus.

The muscularity of the uterus is proved by direct ocular demonstration of the fibres in dissection; by the thickness of the fibres corresponding with their degree of contraction; by the visible action in the human uterus during life; by the resemblance of the laws of its contraction (as felt and as perceived in its consequences) to those which govern the contraction of the other hollow viscera; and lastly, by the vermicular and intestinal motions of the uterus, as seen in experiments upon brutes.

The prevailing notion that the muscular fibres of the uterus are very confused and scarcely perceptible, has prevented authors from founding the rules of practice on the sure ground of anatomy. And if it be possible to place this matter in a clear light, it may banish, perhaps, a certain vagueness which is much to be regretted in so important a department of practice. The most curious, and obviously useful part of the muscular substance of the uterus, has been overlooked; I mean the outermost layer of fibres which covers the upper segment of the gravid uterus. The fibres arise from the round ligaments: and, regularly diverging, spread over the fundus, until they unite and form the outermost stratum of the muscular substance of the uterus. The round ligaments of the womb have been considered as useful in directing the ascent of the uterus during gestation; so as to throw it before the floating viscera of the abdomen: but, in truth, the uterus could not ascend differently; and on looking to the connection of this cord with the fibres of the uterus, we may be led to consider it as performing rather the office of a tendon, than that of a ligament. It is familiarly known, that the subsiding of the belly in pregnancy, occasioned by part of the womb sinking within

the brim of the pelvis, is the least equivocal sign of the approach of labour, and of the pelvis being of due dimensions: and in some measure this is also an assurance of the right presentation of the child. This layer of muscular substance operating on the round ligaments, is well calculated to assist in expelling the fœtus; but also in a particular manner it is provided for bringing down the womb in the first stage of labour, and it is well calculated to give the uterus and the head of the child the right position with regard to the axis of the pelvis. From the connection of the lower extremities of the ligaments with the tendinous insertions of the abdominal muscles, we can conceive that this muscle and these ligaments may shift the position of the womb, and carry it off from the support of the ilium; but otherwise we should be at a loss to conceive how the uterus, by its own action, could adjust the position of the orifice for the delivery of the child.

On the outer surface and lateral part of the womb, the muscular fibres run with an appearance of irregularity among the larger blood-vessels; but they are well calculated to constringe the vessels whenever they shall be excited to contraction.—The substance of the gravid uterus is powerfully and distinctly muscular, but the course of the fibres is here less easily described than might be imagined. This is owing to the intricate interweaving of the fibres with each other; an intertexture, however, which greatly increases the extent of their power, in diminishing the cavity of the uterus. After making sections of the substance of the womb in different directions, I have no hesitation in saying, that towards the fundus the circular fibres prevail; that towards the orifice the longitudinal fibres are most apparent; and that on the whole, the most general course of the fibres is from the fundus towards the orifice. This prevalence of longitudinal fibres is undoubtedly a provision for diminishing the length of the uterus; or for drawing the fundus towards the orifice. At the same time these longitudinal fibres must dilate the orifice, and draw the lower part of the womb over the head of the child.

In making sections of the uterus while it retained its natural muscular contraction, I have been much struck in observing how entirely the blood-vessels were closed and invisible; and how open and distinct the mouths of the cut blood-vessels became, when the same portions of the substance of the uterus were distended and relaxed. This fact, of the natural contraction of the substance of the uterus closing the smallest pore of the vessels, so that no vessels are to be seen, where we nevertheless know that they are large and numerous, demonstrates, that a very principal effect of the muscular action of the womb is the constringing of the numerous vessels which supply the placenta, and which must be ruptured when the placenta is separated from the womb.

I have observed further, that although in producing contraction and thickening of a portion of the uterus, by boiling it, or by other artificial means, the fibres are made very evident, and the blood-vessels greatly constringed; yet they are not so effectually closed as in the natural contraction of the muscular fibres of the uterus. Thus we are led to contemplate the uterus as more peculiarly destined for the safe delivery of the secundines, than for the reception and growth of the ovum. Although its system of vessels be admirably adapted for an increase of action, and for rapid growth, yet it is not so peculiar in this respect as in its muscular structure; for we find, that where the fœtus lodges in the ovarium, it grows, within the term of uterogestation, to the full size: but if the ovum separates from the ovarium, or from the Fallopian tube, in the example of extra uterine fœtus, the woman dies of hæmorrhage, the blood flowing without being restrained by any system of muscular fibres capable of constringing the blood-vessels which are necessarily ruptured.*

The celebrated Ruysch discovered a circular muscle on the

* See a case by Dr. Clarke. Transactions of a Society for the Improvement of Medical and Chirurgical Knowledge. Mr. Taunton shewed me the parts, where a rupture of the Fallopian tube, in a case similar to this of Dr. Clarke, had occasioned a fatal hæmorrhage into the cavity of the abdomen

inner surface of the fundus of the uterus.* The use of this muscle, as he conceived it, is to draw the surface of the uterus, by a gliding motion, from the corresponding surface of the placenta; and thus to separate it and cast it off. By some the existence of this muscle of Ruysch is not admitted; and it has been supposed that he was deceived by the appearance of tortuous vessels.† I have nearly an absolute reliance on the observations of Ruysch: and as I have made a section of the uterus, most exactly corresponding with the engraving in Ruysch's work, I must conclude that he was not deceived in what he saw.

In the papers of Dr. Hunter, published by Dr. Baillie, there is the first accurate observation of the concentric fibres which surround the openings of the Fallopian tubes; the description corresponding with the circular strata of fibres which Weitbrecht has seen encircling the mouths of these tubes.

Upon inverting the uterus, and brushing off the decidua, the muscular structure is very distinctly seen. The inner surface of the fundus consists of two sets of fibres, running in concentric circles round the orifices of the Fallopian tubes. These circles at their circumference unite and mingle, making an intricate tissue. Ruysch, I am inclined to believe, saw the circular fibres of one side only, and not adverting to the circumstance of the Fallopian tube opening in the center of these fibres, which would have proved their lateral position, he described the muscle as seated in the center of the fundus uteri. This structure of the inner surface of the fundus of the uterus is still adapted to the explanation of Ruysch, which was, that they produced contraction and corrugation of the surface of the uterus, which the placenta not partaking of, the cohesion of the surface was necessarily broken.

Further, I have observed a set of fibres on the inner surface

* Ruysch, Dec. 2, p. 34.

† By *Boerhaave* and *Albinus*. See in the Opuscula of *Sandifort* the words of professor *Germ. Azzoguidus*, who has also this idea.

of the uterus which are not described. They commence at the center of the last described muscle, and having a course at first in some degree vortiginous, they descend in a broad irregular band towards the orifice of the uterus. These fibres, co-operating with the external muscle of the uterus, and with the general mass of fibres in the substance of it, must tend to draw down the fundus in the expulsion of the fœtus, and to draw the orifice and lower segment of the uterus over the child's head.

I have not succeeded in discovering circular fibres in the os tincæ, corresponding in place and office with the sphincter of other hollow viscera, and I am therefore inclined to believe that, in the relaxation and opening of the orifice of the uterus, the change does not result from a relaxation of muscular fibres surrounding the orifice. Indeed it is not reasonable to conceive that the contents of the uterus are to be retained during the nine months of gestation by the action of a sphincter muscle. The loosening of the orifice, and that softening and relaxation which precedes labour, is quite unlike the yielding of a muscular ring.

Natural Action of the Uterus.

While the uterus retains its whole contents, the action of its fibres is slow and feeble. Its first movement is to shift its position to direct the orifice aright, and to sink down until the lower segment of the womb rests upon the brim of the pelvis: this it does by the operation of the muscular fibres on the round ligaments, and during this shifting of its position are experienced the true dolores præsagientes. When the waters are discharged, the contractions are more powerful, the child's head presses on the orifice, and the fundus and body of the uterus are more powerfully excited. Now the upper and middle parts of the uterus contract; but it is evident that the lower part of the uterus must, during this contraction of the upper

part, relax and stretch, to permit the child's head to pass.—While the child is contained in the uterus, the muscular fibres cannot greatly contract nor impede the blood in the circulating vessels of its substance. But when the child is expelled, then the contraction of the fibres is considerable, and then they take that arrangement which is inconsistent with a free circulation of the blood; the vessels are constringed. By the time that the placenta is expelled by the contraction of the uterus, the vessels of the uterus are closed, and no active hæmorrhage follows.

Action of the Uterus producing Rupture.

I have examined two cases of uterus ruptured by its spontaneous action, and one in which the violent attempts at delivering the child, ruptured it. In the two first examples the circumstances of the labour, and the appearances on dissection, had a close resemblance. The labour was going on apparently well, when, after a violent pain, the woman vomited a dark matter; on examination the child's head had receded; on putting the hand on the belly of the woman, the form of the child could be distinctly felt. Such was the description I heard when I came to open the body in the first case. I found the fœtus, cord, and placenta lying among the viscera, and the uterus contracted and drawn into the pelvis. The head of the child I found unusually enlarged by hydrocephalus. In the second case, the uterus only was brought to me. In both, the uteri were largely rent transversely, just within the orifice on the fore part; and the margins of the rents were thin and ragged. In the first, the orifice of the uterus was dilated and obliterated: in the second, the lips of the orifice were still distinguishable, being imperfectly dilated and rigid.

In the third case of rupture of the uterus, which I dissected, the circumstances were very different: I went to see a woman, who, being remarkably distorted, I thought could not

survive her labour. I found a gentleman engaged in assisting her; he had proceeded, I believe with perfect propriety, to deliver the woman with the crotchet; he had evacuated the cranium and brought away the frontal and parietal bones; he had got the hook into the foramen magnum, and was endeavouring to bring down the base of the cranium laterally, to accommodate it to the flattened pelvis. In this however he could not succeed. On returning next day I found the patient dead: the body was afterwards conveyed to me. On opening the abdomen I found the uterus still containing the body of the child, and the placenta, but an arm and shoulder projected through a rent on the left side and lowest part of the uterus: it was covered with slime and mucus, and the lips or margin of the rent were quite black and sloughy. It required my whole strength, standing on the table, to draw back the remains of the child's head, which were wedged in the distorted pelvis.

In the first instance, I think the cause of rupture was, that the dilatation of the orifice of the womb was insufficient to admit the preternaturally large head to pass. In the second, the rupture was owing to the rigidity and insufficient dilatation of the orifice of the uterus, while the muscular action of its body was powerful. We know very well, that a muscle during action acquires an additional power of cohesion, and consequently additional strength, but that when relaxed it is comparatively weak. This explains why the rupture takes place at the lower part of the uterus; for there we find, that during the most powerful contractions of the womb, there must be relaxation and dilatation to admit the child's head to pass, and that relaxation is weakness.* In the third case, the remote cause of

* I shall not presume to deny, that the vagina and not the uterus has been sometimes ruptured: yet from the general resemblance in the circumstances of the cases of ruptured uterus, and the appearance of the torn parts, I think the rupture takes place in the uterus, near the orifice. If the orifice of the uterus be relaxed and open, the vagina will not remain rigid, the child's head will descend: if there be no resistance to the contraction of the uterus, the violence of the action cannot be such as to tear the parts. The child and placenta being found in the cavity of the belly, de-

the rupture was the obstruction to the labour, from the wedging of the child's head; the child being forced by the action of the womb into the pelvis, and by the pulling of the accoucheur in the operation of the crotchet, the uterus was bruised against the linea innominata: hence the appearance, peculiar to this case, of blackness and gangrenous sloughs on the edge of the rent in the uterus.* In this case also, the immediate cause of the rupture was the contraction of the uterus, in the attempt to force down and deliver the infant, the violence of which action falling upon the weakened part of the uterus, near the orifice, tore it: the head of the child being locked in the pelvis, was undoubtedly the cause why the whole child was not thrown into the cavity of the abdomen.

Muscular Action of the Uterus considered in the case of Cæsarean Section.

While in partnership with my brother, Mr. John Bell, an occasion occurred which made the performing of this formidable operation an absolute duty. As the description of what occurred during that operation, and the appearances which were presented on dissection, may not be without interest to some here; and as they have a direct connection with my subject, I shall take the liberty of stating them.

In proceeding to examine this woman as she lay with her back towards me, I was surprised to find a large smooth tumour betwixt the thighs, which I could not readily recognize as the abdominal walls, thus distended and strangely pendulous. In this position of the pregnant uterus, with its fundus hanging down, we discover one consequence of great distor-

clares the rupture to take place before the full descent of the head into the pelvis, that is, before the final dilatation of the orifice of the uterus.

* The linea innominata was in this case very sharp; the skeleton is in my collection.

tion in the pelvis, and an insuperable difficulty in the way of the operation of embryulcia, since the child's head does not present to the opening of the pelvis, and cannot be felt per vaginam.

My assigned station in this operation was to raise the tumour of the belly; to present the lower part of it; to prevent the intestines from protruding; to compress the belly, and to follow the receding sides of the contracting womb, and to excite the womb towards its ultimate contraction; on which latter circumstance we all agreed the woman's safety in the first period after the operation must chiefly depend. Mr. John Bell, with his characteristic neatness, made the incision. The incision through the walls of the abdomen was made a little towards the right side of the linea alba, and in the space betwixt the umbilicus and pubes: it was of length calculated to admit the child's head to pass, stretching the parts.* When the integuments and muscles were cut through, I moved my hands, which were spread upon the belly of the woman, so as to make the walls of the abdomen glide on the smooth surface of the uterus. The very great distension of the integuments, and their consequent thinness, made this necessary, to inform those who looked on that the abdomen was actually cut into; and indeed the surface, which now presented of a pale rosy hue, was not even what an anatomical student might have expected. It was matter of wonder to me, that no small vessels were perceptible on the living surface of the uterus, and no sinuses tinged with blood, considering that those vessels make so great an exhibition in dissection. But it was more a matter of admi-

* The incision was made as low as possible, to avoid cutting the upper part of the uterus, and in the expectation of avoiding the placenta. In the operation by Mr. Thomson, (Med. Obs. and Enquir. vol. iv. p. 274) the middle of the incision was opposite to the navel. In Dr. Kellie's very interesting case, the incision was made from two inches and a half above the navel to four inches below it. (Edinb. Med. Journ.) The necessity of evacuating the bladder, which lies above the brim of the pelvis, in cases of great distortion, is sufficiently apparent.

ration to me to observe the effect of the first touch of the knife upon the uterus; for instead of the form of a cut remaining for a moment, the fibres were excited to retract what would otherwise have formed the edges of the incision, and instead of a cut being perceptible, there was, in its place, a circular space, with concentric circles of fibres. Another thing remarkable was, that although the integuments and rectus muscle and substance of the womb were cut, yet there was not as yet a drop of blood to flow over the edges of the wound, no large veins were to be seen in the substance of the womb; and in this we thought ourselves particularly fortunate.

But presently it appeared how much we had been deceived; for the substance of the womb being cut through, the lobes of the placenta rolled out. The placenta was unfortunately attached to the fore and lower part of the womb, and now, notwithstanding that no blood jetted from the womb, I was convinced that the incision must be through the larger blood-vessels, and I already despaired of the woman's recovery.

Mr. Renton, Surgeon of Pennycuik (who had, in a manner deserving the highest praise, delivered the woman on former occasions with the crotchet, in very difficult circumstances,) was prepared to break the membranes; to pass his naked arm into the uterus; to seize the child by the feet, and deliver it. This was done rapidly and dextrously by Mr. Renton passing his hand in a conical form below the lower edge of the placenta: the child was delivered safely, and is now alive. After the delivery of the child, the placenta was thrown out by the action of the uterus.*

The instant the operation was performed, the mother was seized with violent vomiting; and now it required all my strength to compress the abdomen, and retain the parts against

* We did not see a portion of the intestines, owing to due pressure sustaining the lips of the wound; it has occurred in performing this operation, that they have come down into the surgeon's hands upon the rapid subsiding of the uterus.

the operation of the diaphragm and abdominal muscles. For twenty minutes I continued pressing the belly, and compressing the uterus betwixt my hands. The wound of the integuments was dressed; stitches were introduced, the intervals strengthened by adhesive straps; compresses were put on the abdomen, and the belly swathed. But that happened which I foresaw would be the consequence of ceasing to compress the uterus: the woman became more faint, and at last insensible; she lived only to the gratification of her wish, to become, at all hazards, the mother of a living child.

Dissection.

It was fully three weeks before I could procure the body for dissection, yet as this was during a severe winter, the demonstration of the cause of death, and of the state of the uterine contraction, was perfect. On opening the belly, I saw the uterus lying contracted; but the wound of it was gaping, the lips everted, and it now appeared as if the uterus had been cut from the fundus to the neck. This singular appearance and deception I attributed to the contraction of the body of the uterus, while the edges of the incision remained paralysed and uncontracted.* The thickness of the womb was increased to four times the diameter it presented during the operation: but what most deserved attention was the appearance of the large vessels, now with open mouths, which during the operation were not apparent. From the mouths of those vessels the streaming blood had been coagulated, and now formed strings, reaching from the mouths of the vessels to the great cakes of coagulated blood which lay on each side of the abdominal ca-

* Precisely the same appearance presented in the case communicated by *Dr. Hunter, Med. Obs. and Enq. v.* 4. Mr. Thomson's incision was six inches in length of the gravid uterus: on dissection the uterus was found contracted to the size of a common melon; and the wound appeared nearly the whole length of its body.

vity. Besides the coagulated blood which lay in the cavity of the abdomen, a large clot was in the cavity of the uterus.*

From this case we see, that when the substance of the uterus is cut, either the muscular fibres do not fully contract, or in their contraction in consequence of being cut across, they do not constringe the blood-vessels. The misfortune in the case was, that the placenta was attached to the lower and fore part of the uterus; and this, with the defect of action in the muscular fibres, was the occasion of the death of the woman by hæmorrhage.

The circumstances of this case suggest very material improvements in the manner of performing the operation. Instead of cutting into the womb, as was done in the preceding case, I would recommend that a very small incision should be made, such only as would enable a finger to be introduced; by boring, aided by the disposition which the uterus has to dilate, another finger might be passed, and then a third, and at length the whole hand, in a conical form, might be forced into the womb. I further venture to suggest, that this should be done as far down upon the lower part of the uterus, as the urinary bladder and the reflection of the peritoneum will permit; for at the lower part the uterus is least vascular, and most disposed to dilate. In the further prosecution of the operation, the child should not be suddenly extracted, but the feet being brought out by the opening, the body should be slowly delivered by the spontaneous action of the womb; and the whole operation performed as much as possible in imitation of the gradual progress of a natural labour: the only apology for hurry in the operation would be the separation of the placenta, or the compression of the cord in the narrow wound;† but the

* This corresponds with the dissection in the case communicated by Dr. Hunter.

† In the operation by Mr. Hunter, Med. Obs. and Enq. V. V, p. 227, the womb strongly contracted round the neck of the child, so as to retard the delivery of the head and press the funis; it is added, that Mr. Hunter soon overcame this stricture sufficiently to let the head be extracted.—By passing

placenta could not possibly be detached in the method now proposed, and it would be possible to guard against the compression of the cord.

The muscular structure of the womb becomes a subject of very great interest in connection with that of *flooding;* it has been proved by the sections of the uterus, made in different states of its contraction, that the order of the muscular fibres is calculated so as to close the vessels; that where nature has provided for the attachment of the placenta, there the broken vessels are guarded by the provision of the surrounding muscular texture; but we know also, that during this contraction of the superior part of the womb, the lower part dilates and relaxes. Now if the contraction of the womb be essential to the safety of the mother, what will be the effect of the attachment of the placenta to a part of the womb which must relax during the labour! Every one knows the peculiar danger of the case of *placenta previa*, that each labour pain, as it returns, increases the violence of the flooding, instead of checking it. In common cases, breaking the membranes and accelerating the labour, checks the flooding, and secures the safety of the patient; but when the placenta is attached to the orifice of the uterus, the reverse of this takes place.

From attention to the muscular structure of the uterus I have been led to conclude, that in common cases of flooding, during labour, the hæmorrhage is not accidental, in any other meaning of the term, than as it proceeds from the place of the uterus to which the placenta is accidentally attached; that the placenta cannot be partially separated if it be attached in a regular circle to the fundus of the uterus; and that flooding on the commencement and during the progress of labour, is

the fore and middle fingers into the womb, so that a finger might lie on each side of the cord, the pulsation of the cord would be free, however powerful the contraction of the uterus. But in truth there is no disposition in the wound to contract.

owing to an irregularity in the shape and attachment of the placenta.

When the placenta is attached in a regular circle to the fundus uteri, it cannot be partially separated, and cannot be separated bodily, until the uterus is permitted to have a great degree of contraction by the delivery of the child; the circular muscles of the fundus being agents in a double capacity, that is, both in expelling the child, and in constringing the uterine vessels; by the time that the child is expelled, the vessels of the fundus are greatly diminished in diameter. Further, the place and strength of these muscles being perfectly regular and uniform, their action must have the effect of equally drawing the surface of the uterus, which is in correspondence with the margin of the placenta, towards the center of the fundus, and consequently of separating the surface of the uterus from the placenta; but no one part of it will be separated until the general restriction is nearly completed. This will not be the case when the margin of the placenta extends irregularly, or when the placenta is attached to the side of the uterus. After the delivery of the child in cases of flooding, it is not uncommon to find a portion of the placenta low down in the uterus, and separated, while the greater portion remains attached to the fundus. In examining the inner surface of the uterus by dissection, I have seen the part corresponding with the placenta irregular in its form, and extending towards the side and neck of the uterus. In such circumstances of the attachment of the placenta, the retraction on the lower part of the womb being to a greater extent than the fundus, will account for the too early separation of that margin of the placenta which stretches towards the orifice, and also for the hæmorrhage, which is a consequence of this partial separation; but in the progress of the labour, and after the discharge of the waters, the more powerful efforts of the uterus draw the muscular fibres more closely around the blood-vessels, and then the flooding ceases.

The flooding which attends the torpor of the uterus in any

circumstances, when the connection with the placenta is broken, will be very easily accounted for on recurring to the details of the anatomy given in the first part of this paper.

On the Effects of Evacuating the Aqueous Humour in Inflammation of the Eyes; and in some Diseases of the Cornea. By James Wardrop, F.R.S. Ed.

[From the London Medico-Chirurgical Transactions for 1813.]

In January, 1807, some cases of Ophthalmia were published in the Edinburgh Medical and Surgical Journal, in which the evacuation of the aqueous humour was attended with beneficial effects—but at that time, the practice was to be considered only in its infancy, the number of cases in which it had been tried were very limited, and I was unable to point out, with any degree of precision, the particular species of ophthalmia, and the peculiar symptoms of the disease which could be relieved by this mode of treatment. I had, however, sufficient experience to be convinced, that the operation could be performed, in almost every case, without aggravating, if it did not arrest the progress of the inflammatory symptoms; and I therefore embraced that channel of laying my observations before the public, that both the application and the utility of the practice might be established by the additional experience of others.

The subsequent successful result of this mode of treatment in a series of cases of ophthalmia, and its utility in some affections of the cornea, have induced me to bring the subject before the public in this Memoir; being now enabled to point out, with some confidence, the particular species of the disease, and those symptoms, which the evacuation of the aqueous humour is best calculated to remove, and, at the same time, to recommend it as a mode of practice, from which very

important advantages may be derived in some violent and alarming cases.

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§ 1. *General Observations on the Evacuation of the Aqueous Humour.*

I formerly took notice,* that I was first led to evacuate the aqueous humour in some of the diseases of the eye from a very curious phenomenon observed by Dr. Barclay in that organ after death. He remarked, that if the eye of an animal be moderately squeezed in the hand, the whole cornea will instantly become cloudy, and that when the pressure is increased, the obscurity also is increased. If it be still more squeezed, the cornea becomes of such an opake, milky colour, that the iris cannot be distinguished through it. He likewise observed the same appearances to be produced from filling the veins with water or quicksilver; but that, whenever the pressure or over-distending cause was removed, the cornea completely regained its transparency, and appeared as if no such experiment had been made.†

From this curious phenomenon in the dead eye, it was probable that, in the living one, the transparency of the cornea might vary according to the degree of its distension; and that, in some varieties of opacities of the cornea, the obscurity might arise from an increase in the quantity of the contents of the eyeball. Besides, therefore, blood-letting, purging, and the other means usually recommended in the treatment of the inflammation which generally accompanies obscurities of the cornea during the early periods of the disease, it occurred to me, that a more complete and sudden diminution in the contents of the eyeball might be produced by evacuating the aqueous humour.

* Edin. Med. and Surg. Journal, vol. III. p. 56.

† See the Muscular Motions of the Human Body, by John Barclay, M. D.

A favourable case for the trial of this practice soon occurred, where there was a very considerable degree of milkiness and opacity of the cornea, and in which also the eyeball appeared distended, prominent, and accompanied with acute inflammatory symptoms. I discharged the aqueous humour by a small incision through the cornea, and had the satisfaction to find that the operation produced not only an alteration in the degree of transparency of the cornea, but also that the pain, and all the inflammatory symptoms, were removed.

From the success of this case, I was not only convinced of the good effects which this operation might have in removing some opacities in the cornea, but, from the unlooked-for alleviation of the inflammatory symptoms, I was afterwards led to have recourse to this mode of treatment in violent cases of inflammation of the eyeball, in which the cornea had little or no share in the disease.

The evacuation of the aqueous humour in ophthalmia may appear to some, on first considering the subject, a violent and even formidable mode of practice, from the means necessary to accomplish it, consisting in a wound being made in an organ already highly inflamed, and become extremely irritable and painful. But the pain of making a puncture through the cornea is by no means acute, when the cornea itself is not inflamed, or otherwise diseased; and in the operation for the extraction of the cataract, where the cornea is quite sound, I have heard the patients compare the pain in making the incision through it, to a hair drawn across the eye. Though the cornea, in the natural state, has but little sensibility, yet it should be observed, that, if diseased, it becomes the seat of very considerable pain; and when it is inflamed, or when ulceration has taken place on any part of it, the pain of an incision becomes acute: besides, from the irritation which the exposure to light produces in an inflamed eye, and more or less pressure being always necessary to hold the eyeball steady, the evacuation of the aqueous humour cannot be accomplished, in many cases, without giving a considerable degree of uneasiness. The pain,

however, produced by the operation, particularly if it be done with care and attention, soon subsides, and the good effects which quickly succeed, sufficiently compensate for any uneasiness it may have occasioned. Wounds, too, of the cornea heal with uncommon rapidity; and I have not, in a single instance where the operation has been performed, been able to detect the smallest vestige of an incision; nor has it ever occurred, so far as I know, that any visible cicatrix remained, even in those cases in which the operation had been performed when the cornea was in a previous state of ulceration.

In those cases where the practice of evacuating the aqueous humour is judiciously had recourse to, although the operation may create some temporary irritation, yet its good effects will become immediately perceptible, and in most cases will be permanent. The more obvious of these are a more or less considerable improvement in vision, particularly in those cases where there is a cloudiness in the anterior chamber, a complete cessation of the sense of fulness of the eyeball, and pain in the head; and, in some cases, a very remarkable change in the size of the inflamed vessels.

The great and immediate relief which is obtained by the evacuation of the aqueous humour in ophthalmia, most probably arises chiefly from the sudden removal of *tension*. The pain accompanying inflammation in other organs of the body is, in general, in proportion to the degree of tension and resistance of the adjacent parts. It is well known how much relief is afforded in deep-seated inflammations, such as that of the periosteum, and in some varieties of whitloe, by making a free incision through the skin and external parts. The same thing is also illustrated in the good effects produced by dividing the gums during dentition, and in the relief generally afforded by the evacuation of the matter of an abscess. In the eye itself this observation is very strikingly applicable; for it often happens, in violent cases of ophthalmia, that suppuration takes place within the globe, and the purulent matter and humours are suddenly discharged by the coats of the eye burst-

ing. Whenever this takes place, it is invariably remarked, that all the inflammatory symptoms are suddenly alleviated.

There is a case mentioned by Prochaska,* where the aqueous humour was so acrid as to tarnish the cataract knife; yet this change does not appear ever to take place in ophthalmia. I have also heard of a case, where the point of a knife, which was broken off in the anterior chamber, was rapidly oxydated and absorbed.

In those cases where the discharge of the aqueous humour has been found beneficial, it is not even necessary to suppose that its natural quantity is increased. The inflammation will add both to the number and to the size of the blood-vessels within the eyeball, and consequently will increase the quantity of its contents; therefore, if the pain and any of the other symptoms arise, or are aggravated by that unnatural distension, the same good effects will result, whether the contents of the eyeball be lessened by a diminution in the number and size of the blood-vessels, or by the discharge of the aqueous humour. In many cases of ophthalmia, it is very probable that either of these means would have the effect of abating the violence of the inflammatory symptoms; that in some cases the one shall be useful, whilst the other fails; and that, in very violent cases, both means may be employed at the same time with much advantage. It is not, therefore, to be understood, that the discharge of the aqueous humour is here to be recommended as the sole remedy in any case of ophthalmia, but is only to be considered as a powerful auxiliary in some cases, and in others as a sure, and perhaps the only means of preventing the total destruction of the organ.

When the object is to diminish suddenly the contents of the eyeball, the evacuation of the aqueous humour must fulfil this intention in a more complete manner than we can conceive probable to be effected by any means we have of ab-

* Vide Voigtel Handbuch von der Pathologischin Anatomie, II Band. p. 110.

stracting blood from its vessels; for as the ophthalmic artery comes from the encephalon, little blood can be taken directly from any of its branches, and it would require a great quantity of blood to be drawn from the temples, or neighbouring arteries, to make any remarkable change in the quantity of the contents of the eyeball; or, at least, a change equal to that which would be produced by the discharge of the aqueous humour. From the advantages also which have been universally found to arise from a sudden depletion of blood, in comparison with what can be derived from a slow detraction, considerable benefit might be expected from the practice now proposed; for as its effects must be immediate, a sudden change will be produced in the state of the organ, and a change favourable to the abatement of the inflammatory symptoms.

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§ 2. *Of those Cases of Ophthalmia which are relieved by the Evacuation of the Aqueous Humour.*

From the number and variety in the phenomena which accompany inflammation of the eyes, from the combinations and various modifications of those phenomena, and from the fruitless attempts which have been made to describe the different species of the disease, it becomes difficult to point out with precision, in this place, those particular forms of it, in which the propriety of discharging the aqueous humour is indicated. It would be foreign to the object of the present memoir to enter into any elaborate description of the different species of inflammation of the eyes, my intention being to attempt this in a future publication. It will now be sufficient to remark, in general, that those parts composing the organ of vision, in which there is a difference in the natural structure, present different phenomena when they become inflamed. Inflammation of the conjunctiva or mucous membrane of the eye is accompanied with that puriform discharge so characteristic of

all inflamed mucous surfaces, as that of the urethra, vagina, bronchiæ, nose, and every other surface of a similar nature in the body. Inflammation of the different structures which compose the cornea, inflammation of the iris, of the choroid coat, of the sclerotic coat, and of its investing cellular membrane, all present a variety of distinct and characteristic symptoms. Besides this difference, arising from a difference in the natural structure of the parts affected, there are distinct species of inflammation which derive their particular characters from being the effect of specific diseases. Of these we have examples in scrophula, cancer, lues venerea, rheumatism, and gout; all of which occasionally attack the eyes, in common with most other organs of the body. In all these species of ophthalmia particular examples do occur, in which the aqueous humour may be discharged with advantage; for though the inflammation almost always originates, and is most severe, in one of the textures of the organ; yet the whole eye is in many cases more or less affected; and thus symptoms arise which the evacuation of the aqueous humour is well calculated to remove.

I shall therefore, after describing the mode of performing the operation, enumerate those forms of ophthalmia in which the practice has been found beneficial, and illustrate these observations with the history of some cases. Before, however, entering into this detail, I may observe, in general, that there are no states of the eye in which this treatment is so applicable as in those cases where the coats threaten to give way; for, as was before mentioned, many authors, who have described ophthalmia, have particularly noticed, that when the eye bursts, whether from internal suppuration, or from ulceration of the cornea, a remarkable alleviation takes place in the pain, and an abatement in all the other inflammatory symptoms. In the puriform, or, as it is often called, the Egyptian ophthalmia, this is the usual termination of the severe cases of the disease, and is that change which, by producing

a collapse of the globe of the eye, renders the organ irrecoverable.

But besides these, there are cases of a very different description,—in which the evacuation of the aqueous humour is of much advantage, and where the disease, though not of such a dangerous nature, is yet found unmanageable by the means usually employed.

The particular cases now alluded to, are those in which the cornea and anterior chamber acquire a peculiar kind of dimness, the transparency being restored, and the accompanying inflammatory symptoms alleviated, by the discharge of the aqueous humour.

Besides the peculiar muddiness in the anterior chamber, these cases are characterised by an uneasy feeling of distension in some part of the head, chiefly the forehead; and this symptom generally yields to the evacuation of the aqueous humour.

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§ 3. *Of the Mode of discharging the Aqueous Humour.*

The aqueous humour may be discharged by a very simple operation, nothing more being necessary, than to make an opening through the cornea, of a sufficient size to allow that fluid to escape, and in such a situation that any subsequent cicatrix may not impair vision.

The opening may be made with any of the knives commonly used for extracting the cataract. It is sufficient that the point of the knife be introduced so that it makes a puncture into the anterior chamber; and this should be done near the junction of the cornea and sclerotic coat, at any part of the circumference. When the knife has penetrated the anterior chamber, it may then be withdrawn a little, and the blade turned on its axis, so that the aqueous humour will readily escape; and it is better not to remove the instrument altogether, till the fluid is observed to be discharged; for if the inci-

sion be not sufficiently large, and the knife taken away before the aqueous humour flows out, the elasticity of the cornea closes the wound, and either hinders the evacuation from being so sudden, and consequently so efficacious, or the closure of the wound entirely prevents its escape. The operation, therefore, which is necessary to discharge the aqueous humour, is merely the first step of the section of the cornea, made in extracting the cataract, or what has been called *the punctuation of the cornea.*

The chief difficulty in performing the operation arises from the pain occasioned by the necessary pressure on the eyeball, whilst keeping open the eyelids; but until a sufficient portion of the cornea is brought into view, and the movements of the eyeball completely under the management of the operator, the introduction of the knife should not be attempted.

The upper eyelid should be kept open either by the fingers of an assistant, or by Pellier's speculum. If the latter be employed, it will be found useful to have the silver wire covered with a piece of crape, which will prevent its slipping from any moisture of the skin, an accident very common and very troublesome. The operator, with the fore and middle fingers of one hand presses down the under eyelid, and applies their points over the tarsi, in such a manner that they touch the eyeball, and can apply any degree of pressure upon it which may be necessary. After the assistant raises the upper eyelid, the patient should be directed to look downwards; and the assistant then employs a sufficient pressure, to keep the eye in that position.

The operator may then make the puncture; but as the patient is very apt to start when he first finds the instrument coming in contact with his eye, I have found it useful, merely to touch the cornea repeatedly with the back of the knife till all risk of starting is over; and as soon as the back of the extremity of the instrument rests on the part where the puncture is to be made, the knife can be raised very steadily on its point, and then the point thrust into the anterior chamber.

Though I have described the method by which the puncture of the cornea may be made with a common extracting knife, yet it is evident that the aqueous humour may be discharged equally well by other instruments, such as a couching-needle; and of late I have been in the habit of generally employing the instrument of Mr. Cheselden. The more we are in the habit of using any particular instrument, the more dexterity and ease do we acquire in its use.

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§ 4. *Of the Evacuation of the Aqueous Humour in the Puriform Ophthalmia.*

There is no fact more striking in the history of the purulent ophthalmia, than the immediate and permanent relief which many of those unfortunate sufferers experienced, when the eyeball burst, and part of its contents was discharged. During the most excruciating pain of the eye and head, their agony was suddenly relieved when this accident took place, which in some cases was even accompanied by a cracking noise. This is particularly taken notice of by those who have related the history of the disease, and it will be found a striking incident in all the accounts given by patients themselves, in whom the organization of the eye is found to be destroyed.

An artificial mode of diminishing the contents of the eyeball might, in such cases, be naturally expected, not only to produce the same alleviation of the violent symptoms of the disease, but by preventing the rupture of the cornea, and the subsequent protrusion of the iris, which takes place, would save the organ from that total destruction which is almost the inevitable consequence of the natural progress of the disease. The evacuation of the aqueous humour is well calculated to fulfil this purpose, and in a very considerable number of cases has been followed with the happiest effects. Mr. Ware, whose authority is so well entitled to our respect, first mentioned to me the probable good effects which the evacuation of the

aqueous humour might be expected to produce, in those cases where the eyeball shows a tendency to burst; and in some remarks which he afterwards published on the purulent ophthalmia this practice is recommended, and two cases are given where it was successfully employed. The practice has also been adopted in this species of ophthalmia to a very considerble extent, by Mr. Macgregor, surgeon to the York asylum.* "I have, within the last two years, (Mr. M. remarks) performed this operation in twenty-three instances, with a degree of success that strongly induces me to recommend it. For of this number, twenty-one were immediately relieved by it, and afterwards recovered their sight under the usual mode of treatment." And again Mr. M. observes, "It is to be regretted that this operation is not more frequently performed; for I am convinced that many persons have lost their sight from a rupture of the cornea taking place at that part opposite the pupil, which a timely and judicious performance of this operation might have prevented." As in the greater proportion of the cases which have come under my observation, the disease has been particularly mild, I have had no opportunity of reaping the benefits of this operation; for, among several hundred examples, there has not been one case where the cornea burst, or where suppuration took place within the eyeball: all the more severe symptoms being speedily removed by bleeding, purging, and a strict pursuance of the antiphlogistic regimen.

The more violent cases of this ophthalmia have appeared chiefly in the army, and it is therefore in our military hospitals, where we can expect to find most advantage from this practice.

In addition, therefore, to the other means commonly employed, more particularly bleeding and purging, the evacuation of the aqueous humour must be considered as a useful

* Transactions of a Society for the Improvement of Medical and Chirurgical Knowledge, vol. iii. p. 60.

remedy in the puriform ophthalmia. Its introduction into those countries where the disease is particularly prevalent, and where it appears in the most severe and dangerous forms, would be attended with the most beneficial effects, and its judicious employment might be the means of saving the eyes of many of our soldiers who are abroad, more particularly those on the Mediterranean stations.

Little difficulty can occur in selecting the fit cases, and in determining the proper period for performing the operation. No states of the eye, during the progress of this disease, can arise, as far as I know, which could render it improper, provided the accompanying symptoms are in any degree severe; and therefore the practice should be had recourse to, in all cases where the pain in the head and sense of distension in the eyeball are considerable. In those cases where the cornea threatens to burst, the operation becomes particularly urgent, and should be had recourse to without delay. The bursting of the cornea, in some cases, is preceded by an apparent change in the structure of that part of the eye; in other cases no previous alteration can be detected. The changes generally observed are, that the cornea becomes muddy in one part, or over the whole surface; or its surface is studded with small white spots, which run into one another, as the inflammation advances to suppuration; and then ulceration of the cornea, to a greater or less extent, always takes place. In other cases, the cornea suddenly gives way, without any apparent previous change.* This has been particularly taken notice of by Dr. Veitch, and he remarks, that in some cases of this ophthalmia, where he had an opportunity of examining the eye, both immediately before and after the aqueous humour was discharged, this fluid had escaped "by a division of the cornea, which was nearly as clean as if it had been cut with a knife." In the purulent ophthalmia of children, I have had repeated opportunities of making the same remark, and

* Observations on Ophthalmia, by Charles Farrel, M.D.

observing a straight division toward the centre of the cornea, the adjacent cornea being apparently sound.

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§ 5. *Of the Evacuation of the Aqueous Humour in the Puriform Ophthalmia of Children.*

The history, symptoms and consequences of the puriform ophthalmia in children, are so extremely similar to those of the puriform ophthalmia of the adult, that what has been said of the effects of evacuating the aqueous humour in the one, may be repeated regarding the other. When the inflammation arising in the conjunctiva advances to the other textures of the eye, and is not arrested in its progress, the eyeball often bursts by a rupture of the cornea. Now when there is any danger of apprehending such an accident, when an ulcer of the cornea is making rapid progress, or where the violence of the inflammatory symptoms indicate the danger of a rupture of the cornea, the aqueous humour may be evacuated, with the hope, not only of alleviating the severe symptoms of the disease, but of preventing that destruction of the cornea which is always followed by a change in the form of the eyeball, an obscurity of more or less of the cornea, a displacement of the iris, and a deformity or destruction of the pupil.

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§ 6. *Of the Evacuation of the Aqueous Humour in the Gonorrheal Ophthalmia.*

Though we have no means of arresting the progress of some specific diseases, yet a great deal may be done to mitigate their symptoms. When the eye becomes affected with gonorrheal ophthalmia, the progress of the disease is generally so rapid, and the symptoms of it so severe, that the most powerful remedies are necessary to prevent its speedy destruction. Besides, therefore, the extensive depletive system,

which should in such cases be adopted, it will be of great importance to watch the progress of the disease in the anterior chamber, and when any symptoms do occur which indicate a rupture of the cornea, the aqueous humour should be evacuated without delay.

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§ 7. *Of the Discharge of the Aqueous Humour, where the Capsule of that Humour is inflamed.*

On a former occasion* I attempted to show, that each of the three distinct textures which compose the cornea may be separately inflamed. There is no inflammation of the eye, where so much benefit is derived from evacuating the aqueous humour, as when that inflammation affects the internal layer of the cornea or membrane which contains the aqueous humour.

This disease is marked by a muddiness or turbidity of the anterior chamber, which an ordinary observer would not readily ascribe either to an opacity of the cornea, or to a diminution in the transparency of the aqueous humour. Besides this diffused cloudiness there are generally one or more defined spots, which distinctly denote an opacity of the cornea. These do not resemble a common speck, but have a mottled appearance, and around the opake, white, central points there is a kind of disk, very like what we perceive in some agates, and what are commonly called the eyes of pebbles.—There is not much external redness accompanying the obscure anterior chamber—a blush of vessels only being seen around the sclerotic coat, at that place where the iris is attached to it; neither does the patient seem to suffer much pain from the effects of light, as he can generally open the eyelids and keep them so, and finds no benefit from a shade. The symptoms of this disease which are most distressing, are a sense of fulness and

* Essays on the Morbid Anatomy of the Eye, p. 8.

distension of the eyeball—as if it was filled with matter, and a dull agonizing pain, generally either in the brow or back part of the head; or in both these parts.

In this disease I have never found the evacuation of the aqueous humour fail in procuring an immediate relief of the pain of the head, and an instantaneous restoration of the transparency of the anterior chamber.

CASE I.

A woman, fifty years of age, had a general milkiness of the anterior chamber of the left eye, and a slightly opake spot nearly on the centre of the cornea. On the white of the eye there were a considerable number of distinct red vessels, none of which passed over the cornea. She could distinguish light with this eye, or a dark object placed between her and the light; but neither form nor colours. Exposure to light gave her little uneasiness.—Had occasional epiphora, but particularly complained of a dull pain, extending through the head and eyeball.

The affection had lasted about a fortnight. After having had headach during the night, she found the eye red and painful when she awoke, and objects appeared as if seen through a mist. The symptoms had afterwards gradually increased.

Treatment.—I discharged the aqueous humour by a puncture through the cornea; and immediately after the operation she could perceive a finger with a ring on it, which was held before her eye.—She complained of a sensation as if a mote were in the eye, but she felt no acute pain. The cornea immediately regained its natural transparency, except at the speck, which became more distinctly circumscribed.

Some hours after the operation, the pain recurred with considerable violence, but it was relieved by the operation of a purge, fomenting the parts adjacent to the eyeball, and cup-

ping the temples; and in a few days the eye was quite recovered.

CASE II.

In a youth fifteen years of age, the anterior chamber of the right eye had lost a good deal of its natural transparency, which appeared as if it proceeded partly from an obscurity of the cornea, and partly from a turbidity of the aqueous humour. There was a bright crimson redness over the whole albuginea; the vessels appeared deep, yet their ramifications were distinct. He complained of a sense of fulness in the eyeball, and of a dull, heavy pain in the orbit, eyebrow, and extending through the head. The pain of the eye was much increased by exposure to light. The inflammation had existed for three weeks, and had from its commencement been attended with the pain in the head.

Treatment.—The pain in the brow and head subsided immediately after the aqueous humour was discharged, and in the course of two days, the redness and obscurity of the anterior chamber went off.

CASE III.

There was a want of transparency in the anterior chamber of the right eye, which seemed, partly, to proceed from an opacity of the cornea, and partly, from a turbidness of the anterior chamber.

A bright scarlet-coloured inflammation appeared over the whole albuginea, and the vessels seemed deep, but the ramifications were quite distinct. Exposure to light was very painful, and the patient complained of a sense of fulness in the eyeball, and of a heavy pain in the orbit, and brow, extending through the head. The inflammation had continued three

weeks, and from its commencement had been attended with pain in the head.

Treatment.—The aqueous humour was discharged, and, immediately afterwards, the pain in the brow and head completely subsided. The smarting from the operation continued only for a few minutes. He could open his eyes more freely. Redness increased, but of a darker shade, and the vessels appeared more tortuous. No pain in the eye.

CASE IV.

A sailor boy, thirteen years of age, felt an itching sensation in his right eye, which, by constant rubbing, became red and painful. About eight weeks after, he was at sea during a storm of thunder and lightning, which increased the inflammation. The left eye also, at that time, became affected. I saw him about ten weeks after the first attack. The anterior chamber of the left eye had become dull and cloudy; and there were three or more milk-white spots on the cornea, of the size of a pin's head, perfectly round, and distinctly circumscribed. The pupil was a little contracted; and there was only a very slight redness of the sclerotica, near to its union with the cornea. There was also a general cloudiness of the cornea of the right eye; and, on the inferior part of it, there was a speck of considerable size, with several red vessels ramified through it. There were also some small opake circular specks on different parts of the cornea. The blood-vessels were more numerous on the sclerotica of this eye than of the left. Exposure to light gave him acute pain in both eyes, and made them gush with tears. He had violent pain in both eyes, but particularly in the right; and he described the pain as having been extremely severe the day before, through his whole head. He also felt a sense of distension or weight over the eyebrow, and had a little general fever. A by-stander observed, that his eyes appeared too full.

I made an incision into the cornea of the left eye, and the aqueous humour spirted out forcibly. The operation occasioned smart pain for two or three minutes. A little blood afterwards appeared in the anterior chamber, which was effused in consequence of the division of the red vessels which entered the edge of the cornea. The operation was afterwards performed on the right eye, and it caused more acute pain than in the left, for the incision was made through a cornea which was highly vascular, and had acquired a morbid degree of sensibility. In a few minutes, all the pain, which he conceived to arise from the cut, subsided; and the uneasy fulness and distension in both eyes were greatly diminished. He was ordered to use fomentations, and to take a purgative medicine. I saw him three days afterwards: he had no return of the pain of the eye or head since the operation: he could endure the light; and his vision was so perfect, that he walked two miles, and could distinguish readily, and without uneasiness, all objects around him. The opacities of the cornea of both eyes were greatly diminished; and there was very slight redness of the sclerotica.

CASE V.

A healthy-looking man, forty-five years of age, had inflammation in both eyes for six weeks, which began after the abatement of a violent pain of his head. There was a general cloudiness of the cornea of the left eye. The iris could be distinguished but indistinctly. There were numerous vessels on the white of the eye; and they formed clusters on different parts, giving it a mottled appearance. The eye looked unnaturally dry; and there was no intolerance of light. The disease in the right eye had the same appearance; but the cloudiness was limited to two thirds of the cornea; and the red vessels were not so numerous as in the left eye. The vision of the left eye was almost entirely destroyed; and with the right one,

objects appeared as if seen through a mist or smoke. Both eyes looked full and prominent. An eye-water, of corrosive sublimate, and the application of an ointment composed of the red oxyd of mercury, diminished, in a few days, the inflammation and opacity of the right eye. The obscurity of the left cornea, however, increased, so that the iris and pupil were very indistinctly seen through it.

Treatment.—I perforated the left cornea with a spear-pointed couching-needle, and immediately it appeared clearer to several by-standers. The operation was attended with no pain, neither was it followed by any inflammation. He afterwards used a wash of the nitrate of quicksilver, and the cornea soon regained its transparency. The pupil, however, remained a little irregular, with a slight dimness behind it; and objects appeared with this eye as if through a mist. By the external application of sulphuric æther, the dimness disappeared; and I saw him eight months afterwards, when he told me that he then saw as well as when he was a boy; for he had been short-sighted before his eyes became inflamed; and probably the operation had diminished the natural convexity of the cornea.

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§ 8. *Of the Evacuation of the Aqueous Humour in Abscess of the Anterior Chamber.*

In all cases where a puriform fluid is forming in the anterior chamber, the evacuation of the aqueous humour will be found highly useful; for, except in a very few remarkable instances, this never occurs where the inflammatory symptoms are mild. In most cases the deposition of a puriform fluid is attended with great pain in the eye and head, and a sense of fulness and tension of the eyeball. When these symptoms are not subdued by the common methods of treatment, ulceration of the cornea takes place, and the matter, along with the aqueous humour, is discharged, whilst more or less of the iris is protruded through the wound. The artificial discharge

of the aqueous humour in the early stages of the disease, alleviates all the inflammatory symptoms, whilst the employment of the same means in the more advanced stages of the complaint, invariably prevents that rupture of the coats of the eye, which in general very much impairs, if it does not entirely destroy its organization.

In some cases the matter deposited in the anterior chamber, has a considerable degree of consistence and tenacity, and will not be discharged by that puncture which is sufficient to evacuate the aqueous humour. When the matter is in small quantity, it is necessary to discharge only the aqueous humour, for, if the inflammatory symptoms be alleviated, the matter will afterwards be speedily absorbed; but in those cases where the quantity collected is considerable, and necessary to be evacuated, it is requisite to make an incision in the cornea nearly equal to that for the extraction of the crystalline lens.

CASE VI.

A man forty-five years of age, had a violent inflammation of the whole eyeball in consequence of a blow which he received on it three weeks before from a piece of coal, when mining. Nearly one half of the anterior chamber was filled with a puriform fluid. The central part of the cornea was opake, and ulceration was commenced on its surface, and he complained of violent pain both in the eye and head. A semicircular incision was made in the cornea, through which the aqueous humour along with the matter were evacuated. The pain ceased instantly. The wound of the cornea soon healed, no inflammatory symptoms returned, and the cornea regained its transparency by the application of stimulants, leaving only a small speck. It was evident, that in this case the cornea would have soon given way where the ulceration had commenced; by which the organ would have been completely destroyed.

CASE VII.

A gentleman, about twenty-one years of age, had a very violent inflammation of the left eyeball. The sclerotica was covered with numerous scarlet-coloured blood-vessels; but none of them passed over the transparent cornea. The anterior chamber was turbid; and several small spots, of a matter resembling pus, were seen in it, towards its circumference. The pupil was much contracted, the eyelids swelled, and their external surface covered with varicose veins. There was a constant flow of acrid tears. Vision was almost entirely destroyed; but, notwithstanding, the eye was extremely sensible to light. He had great pain in the eyeball, and constant headach, with a sense of fulness in the orbit. The inflammation had begun five weeks before, without any known cause, and every symptom had, since that time, gradually increased.

Treatment.—I made a puncture with an extracting-knife through the cornea, and the aqueous humour spirted out. From the difficulty in securing the eyeball, the pressure employed gave considerable pain. The incision smarted for two or three minutes; but, before I left the room, he said he found great relief; and that the pain in the eyeball and head, and the peculiar feeling of weight and distension, were entirely removed. On examining the anterior chamber, all the turbidness had disappeared, and the cornea seemed perfectly transparent. He was advised to do nothing but foment the eye and the neighbouring parts, and to take a purge. As he lived at some distance from town, I had no opportunity of seeing him afterwards; but I was informed, that an hour after the operation, all the pain, occasioned by the incision and the pressure, was entirely gone, and the eye had become quite easy. In two days all the redness went off; and I was informed, that the mark of the incision could not be discovered; that the inflammation had disappeared; and that his vision was nearly as perfect as it had been before the commencement of the dis-

ease. Some months afterwards, I heard that he continued perfectly well.

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§ 9. *Of the Effects of discharging the Aqueous Humour in Staphyloma.*

The effects which are produced by discharging the aqueous humour in some cases of staphyloma, illustrate in a very satisfactory manner, the mode by which this operation seems to alleviate the symptoms of ophthalmia which have been already noticed. For in many cases of this disease, whilst the staphylomatous tumour is increasing in bulk, the ball of the eye becomes inflamed, and the patient generally complains not only of a sensation of uneasiness and fulness in the eye itself, but of a pain more or less severe in the brow of the affected side; and, under these circumstances, the escape of the aqueous humour fails not to produce immediate relief, and none of the inflammatory symptoms recur until a regeneration of that fluid takes place.

The aqueous humour is often evacuated without the interference of art, the portion of the cornea which most easily gives way allowing an exit to that fluid. In several cases I have been able to observe this process frequently take place, so that ultimately a fistulous opening was established, which either remained always pervious, or which was occasionally closed by a thin, pellucid membrane which gave way, wherever a superabundant quantity of fluid was collected in the eyeball.

This natural progress of the disease points out a very easy method of affording relief when the pain and inflammatory symptoms are severe: under such circumstances, the aqueous humour may be evacuated by puncturing the tumour, an operation which cannot fail to alleviate all the symptoms, in as complete a manner as would be fulfilled by that process which nature would ultimately have accomplished.

CASE VIII.

A gentleman who had a staphyloma of one eye for some years, produced in consequence of a severe attack of inflammation, but which, till now, had given him little pain or uneasiness, was suddenly seized with pain in it, which soon spread to the brow and back part of the head; and became so agonizing, that in a few hours he was nearly distracted with its severity. He became extremely pale, and his pulse was very feeble.

Treatment.—I discharged the aqueous humour, from which he obtained instant relief; and in a few hours he was perfectly recovered. He was three or four times similarly attacked, at the intervals of several weeks. The discharge of the aqueous humour was each time followed with instant and complete relief; and in order to prevent the recurrence of the symptoms, after puncturing the most prominent part of the cornea, I cut out a small circular portion of it. This opening was afterwards covered with a thin pellucid membrane, which readily gave way whenever there was a superabundance of the aqueous humour; and since the opening hath been made, he has remained free from pain.

CASE IX.

A woman received a sharp blow on her eye, which was considerably enlarged from a staphyloma. Two days afterwards the diseased eyeball was inflamed, extremely sensible to the touch, and she complained of a severe pain in the brow, extending through the head, accompanied by great prostration of strength, sickness, and fever. I punctured the staphyloma, and discharged a bloody fluid, after which she received much relief: the pain in the head disappeared, and the eye became easier. Four days afterwards the pain returned, but complete

relief was obtained by again evacuating the contents of the staphyloma.

It is very probable, that in this case all the violent symptoms were produced from an effusion of blood within the eyeball, in consequence of the injury.

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§ 10. *Of the Effects of evacuating the Aqueous Humour in Prolapsus of the Iris.*

Even after the cornea has given way, and the aqueous humour has been evacuated, in severe cases of ophthalmia, the relief which that discharge produces does not remain permanent, for the portion of the iris which is prolapsed, so completely fills up the wound, that no more aqueous humour can escape, should its quantity become superabundant. Under such circumstances, an artificial discharge not only alleviates the inflammatory symptoms, but, if the protrusion of the iris has been recent, the depletion of the anterior chamber will permit the iris to fall back into its natural situation. In a case of this kind, where Mr. Ware performed the operation, immediately after the evacuation of the aqueous humour, the iris resumed its natural position. Should the iris still continue to be pressed forward, even after a puncture has been made on the cornea, recourse might then be advantageously had to the ingenious proposal of the late Mr. Gibson of Manchester. When the iris was prolapsed, either through a wound or ulcer of the cornea, Mr. G. found that the displacement arose from the portion of the aqueous humour lodged behind the iris, constantly pressing that membrane forwards at the point where there was least resistance. In such cases he made a puncture in the prolapsed portion of iris; and when the fluid collected behind it was discharged, it immediately regained its natural situation; unless in those cases, where, from the duration of the disease, the situation of the iris had become unalterable, from adhesions having formed between it and that portion of the cornea with which it was in contact.

§ 11. *Of the Effects of evacuating the Aqueous Humour, in Injuries of the Eyeball.*

Injuries of the eyeball are very often followed by severe and tedious attacks of inflammation, more particularly when from punctured wounds, and wounds penetrating into any of the cavities.

Besides a powerful antiphlogistic treatment, much benefit will often be derived by discharging the aqueous humour, especially in those cases where, along with pain and redness of the eye, there is a sense of fulness and dull pain about the eyebrow, or some other part of the head;—symptoms of ophthalmia, which, it has already been remarked, the evacuation of the aqueous humour is particularly well calculated to remove. In all cases, too, where there is a tendency to the formation of matter after injuries of the eye, the discharge of the aqueous humour becomes a powerful auxiliary to the other means usually employed.

CASE X.

At the union of the cornea and sclerotica of the eye of a middle aged woman, towards the upper and nasal part, there was a prominent bluish-coloured tumour, covered with a network of red vessels, and the iris was drawn towards that part, so that the pupil was of an oblong form. There were a good number of red vessels over the sclerotic coat, and a dimness of the whole anterior chamber.

She complained of much pain in the eyeball, but particularly in the brow and temples. Her sight was impaired, and the pulse frequent and full. About eight days before, she had received a wound of the eye, either from the spur or beak of a cock. All the symptoms were alleviated by the discharge of the aqueous humour, particularly the pain in the head, which was instantly removed; and the redness of the conjunctiva was much diminished. A slight heaviness about the eyebrow re-

mained for a day or two, but went off by the use of brisk purgatives.

CASE XI.

While a strong healthy man was employed hammering melted iron, a piece of it fell into the eye, and was found lying between the eyeball and under eyelid. It occasioned most excruciating pain, and although it was removed in a few minutes, violent inflammation succeeded, and I saw him four days after the accident. The whole conjunctiva was then very much inflamed, and it was so much swelled, that the cornea appeared as if depressed. There was a white slough towards the inferior part of the sclerotic coat, and on the corresponding portion of the internal palpebral membrane; but the cornea was not injured, nor its transparency diminished. He complained of great pain in the ball of the eye, extending over the forehead, and through the whole side of the head. He could not raise the upper eyelid without the assistance of his finger. Light gave considerable uneasiness, and his vision was so much destroyed, that he could only distinguish between light and darkness.

Treatment.—Under these circumstances I discharged the aqueous humour by making a small opening through the transparent cornea. The operation occasioned a smarting pain, which lasted a few seconds; when it went off, he said he could open the eyelid much easier; and was surprised to find that he could even distinguish the furniture of the room and books in a library. Slight scarifications were afterwards made on the under eyelid, which bled freely; and he was advised to foment the temples and adjacent parts; and as his pulse was frequent and full, he was bled at the arm, and ordered a brisk purge. During the remaining part of the day, the pain of the eyeball was much alleviated, and that of the head was completely removed, except that an uneasy sensation still remained in the brow. On the following day there was no vestige of the wound of the cornea; the pain and swelling of the conjunctiva were

nearly gone, but the redness continued. His vision was quite distinct, but the eye was irritable. In three days, by the application of an opiate, the inflammation was completely removed, his vision perfectly restored, and he returned home complaining merely of a little tenderness. Since which he has remained well.

A case of inflammation of the eye, occasioned by a burn, exactly similar to the case just related, though the symptoms were not so severe, was completely relieved by the evacuation of the aqueous humour, which suddenly mitigated the pain, and removed all the inflammatory symptoms.

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§ 12. *Of the Changes produced in* Opacities *of the Cornea from the Discharge of the Aqueous Humour.*

It has already been observed that a diminution might take place in the transparency of the cornea, from an alteration in the quantity of the contents of the eyeball, and it has also been noticed, that in the dead eye the cornea assumes a milky colour when pressure is applied upon the eyeball, or when the veins are injected with clear water.

That some opacities of the cornea are produced from an increase in the quantity of the contents of the eyeball, and not from the deposition of an albuminous fluid in the texture of the cornea, as takes place in common speck, seems to be proved from the immediate effects which have resulted, in some instances, from the discharge of the aqueous humour. In these cases the opacity of the cornea seemed entirely to arise from over-distension; for the instant the aqueous humour was discharged, the cornea regained its natural transparency, as imitated in the experiments on the dead eye. In other cases it was evident, that the opacity of the cornea depended on two distinct causes; the one, as in the former cases, arising from over-distension,—whilst the other proceeded from that change in the structure of the cornea which produces common speck. Cases of the first class are distinguished by a cloudines or

turbid state of the whole anterior chamber; whereas in common speck the obscurity is more defined, being limited to a certain portion of the cornea.

These two different kinds of opacity were strikingly illustrated, in some instances, where both took place in one eye at the same time, there being a general dimness throughout the whole anterior chamber, besides some defined spots in particular parts of the cornea. In these cases, the instant the aqueous humour was discharged, all the general obscurity disappeared, and nothing remained but the more opake spots, which became more distinctly circumscribed.

From what has been already said, little difficulty will arise in selecting those cases of opacity of the cornea, which the evacuation of the aqueous humour is calculated to remedy. From the cases, the particulars of which are detailed, the beneficial effects of the operation are sufficiently obvious, and would lead us to expect very important results from future experience.

CASE XII.

In a girl, twelve years of age, the whole of the white of the right eyeball had become of a bright red colour, from a number of blood-vessels, whose trunks could all be separately distinguished running in straight lines towards the cornea, and some of their small branches passed over its edge, and were distributed into its substance. There was a circular-shaped speck, of a considerable size, near the centre of the cornea; and throughout the rest of the cornea, particularly around the speck, there was a good deal of muddiness. The upper eyelid was slightly swelled, with some varicose veins on its external surface; whilst the vessels of the internal membrane were increased in number and in size. She had a good deal of pain in the eyeball, but it was particularly severe in the side of the head and temple above the affected eye. Though the vision was destroyed, yet she complained when the eye

was exposed to a bright light. The disease had continued three weeks. It began with the sensation of a mote in the eye, attended with pain; the following morning it was very red, and every symptom had increased daily.

Treatment.—The aqueous humour was discharged, which caused a good deal of smarting, but in a few minutes it subsided. A great change took place in the transparency of the cornea, all the general cloudiness instantly going away, and the speck left much more distinctly circumscribed. During the course of the day the pain of the head and eye went off, and she slept well during the night, whereas formerly her nights were very restless and disturbed by startings. On the day subsequent to the operation, she had not the least pain in the head or eye; the eye was not very sensible to light, and the number of blood-vessels was very much diminished. She could now readily distinguish all her fingers, and observe large objects at a considerable distance.

CASE XIII.

The eyeball of a woman, thirty-eight years of age, was very much inflamed, and some spots of a purulent looking fluid were seen in the anterior chamber; whilst, at the same time, there was a considerable degree of opacity throughout the cornea. She complained of an intense pain of the eyeball, and in the forehead and temples. The disease was of three weeks standing.

Treatment.—The aqueous humour was discharged, the parts were afterwards fomented, and she took a brisk purge. On the following day the pain of the head was much easier, and the blood-vessels were less numerous.—She rapidly got well.

CASE XIV.

A lady, thirty-two years of age, had complained, during eleven weeks, of an inflammation in her right eye, attended

with pain occasionally in the forehead, and inability to look at objects. There was a very opake speck of the cornea opposite the pupil, with a degree of turbidness around it, so that nearly the whole pupil was hid; the white of the eye was slightly red, and the eyelids were of a purple colour towards the edges; the eye watery. Scarifications, opiates, and stimulants, gave no relief.

Treatment.—The aqueous humour was discharged, and instantly the whole speck, except a small central portion, disappeared, and she could distinctly see with this eye immediately afterwards. All the inflammatory symptoms subsided in a few days by fomentations.

CASE XV.

The whole of the white of the eye of a healthy middle-aged man was crowded with vessels of a large size, and of a bright red colour: these vessels all terminated at the margin of the cornea, ran in a straight direction towards it, and did not ramify until they approached it, and there they divided into numerous branches. The transparency of the anterior chamber was diminished, and all objects appeared dim. The eyelids were a little swelled, and the blood-vessels on their internal surface, though not much increased in number, were enlarged and turgid. He had a violent pain in the forehead, which was not constant, but came on in such severe paroxysms that he could scarcely support their violence. The inflammation had come on four days before without any evident cause.

Treatment.—When the aqueous humour was discharged, the anterior chamber acquired its natural transparency, and he could more clearly distinguish objects. A remarkable change took place in the blood-vessels of the white of the eye; the number of them was so much diminished, and also their size, that the eye at once lost all the appearances of inflammation.

Besides ordering a purge, and applying fomentations to the eye, it was thought proper to bleed this patient, from the violence of the inflammation and its accompanying fever. Under that treatment he got well rapidly.

Two Cases of Ulcers in the Cornea, where the Aqueous Humour was advantageously discharged.

CASE XVI.

In a young lady the anterior chamber of one eye appeared very turbid, and there was an *ulcer* on the central part of the cornea, and a cluster of blood-vessels passing towards it; the whole eyeball was much inflamed, having the peculiar redness of the pustulous ophthalmia.* She complained of an agonizing pain in the forehead, which sometimes went off during the day, but was always severe in the night. The inflammation had lasted fifteen days, the pain in the head only eight days; little sleep, pulse quick, and the tongue white.

Treatment.—Discharged the aqueous humour by puncturing the cornea at the place where the vessels passed. The pain in the head never afterwards returned; and all the other symptoms rapidly subsided by the use of fomentations, and the vinous tincture of opium.

CASE XVII.

A healthy looking young man had an ulcer of the cornea, accompanied with a good deal of inflammation and pain in the eyeball, in consequence of the suppuration of a pustule. The ulceration and inflammation subsided rapidly by the use of the vinous tincture of opium.

A few days after the eye had recovered this attack, he was suddenly seized with acute pain in it, which soon extended

* See Essay on the Morbid Anatomy of the Eye.

to the head. When I saw him, three days after its commencement, there was a distinct erosion, in two or three different places, with a good deal of muddiness of the cornea. There was also a bright redness on the white of the eye; he had intense pain in the head, accompanied with excessive languor and debility; his tongue white, and a quick hard pulse. The obscurity of the cornea instantly disappeared by the evacuation of the aqueous humour, and the pain of the head was alleviated. He was bled at the arm profusely, and the eye was fomented. On the following day all the symptoms were much relieved; and in a few days the ulcer healed, and the eye recovered perfectly, without the aid of any local applications.

Observations on the Cataract.

By Benjamin Travers, Esq. Demonstrator of Anatomy at Guy's Hospital. Surgeon to the Hon. East India Company, and to the London Infirmary for Diseases of the Eye.

[From the London Medico-Chirurgical Transactions for 1813.]

Opacity is the result of inflammation in a transparent part, as is seen in the scarf-skin, the conjunctiva, the cornea, the crystalline and vitreous humours of the eye, and their membranes. If the inflammation is arrested before it reaches the stage of effusion, the opacity, which probably depends upon the turgescence of the colourless vessels, is partial; and the part recovers its transparency when the inflammatory action ceases. This is proved by the haziness of the cornea in acute inflammation of the conjunctiva, accompanied by dimness of vision; a symptom which gradually goes off after the inflammation is subdued. When effusion has taken place even in a moderate degree, as in the nebula of the cornea, the opacity is more slowly removed, and seldom perfectly, even long after the inflammation has ceased. Where a deposition has taken place in consequence of a breach of the natural texture, as

after an ulcer of the cornea, the opacity, greater or less according to the extent of the deposition, is permanent. Inflammation is the only cause of cataract open to observation. The simplest example of it is afforded by the accidental wound of the crystalline by a penetrating instrument; in this case the opacity is partial, and the cicatrix of the wound is the centre of the opake spot. Another frequent example is the cataract following acute inflammation of the choroid and iris, whether arising spontaneously or from injury, as a violent contusion of the eye. In this case the opacity is sometimes diffused over the capsule of the lens which adheres to the contracted pupil; sometimes it is only a central spot, and the iris seems to adhere to a transparent part of the capsule.

A conformation of body favouring a determination of blood to the brain, or frequent exposure of the eye to the stimuli of heat and light in more than ordinary intensity, or the habitual vision of minute objects in a depending position of the head, by which an undue proportion of blood is thrown upon the organ, commonly induce opacity of the crystalline or of the retina; which in one species of amaurosis turns of a green yellow colour, and becomes distinctly visible.

Cataracts are very frequently of spontaneous occurrence in persons of advanced years, in whom no signs of inflammation have preceded the complaint.

Transparent parts obviously tend to become opake in age, as may be instanced by the want of clearness of complexion in old persons, and the *arcus senilis*, as it is called, which is an opacity without inflammation encroaching upon the cornea. The very minute serous vessels of the crystalline run in the cellular substance which unites the lamellæ. This interstitial texture is probably absorbed in age, and the vessels may be gradually obliterated by compression;* but this must be matter of conjecture.

* A change in the action of so minute and remote a system of vessels we should not expect to discover otherwise than by its local effects. Changes in other organs, similar to those which produce the different kinds of cataract,

Cataracts are also formed *in utero*, and I have rarely observed in the subjects of congenital cataract other marks of deranged or defective organization. Some other and more subtle cause of opacity must therefore be admitted.

The cataracts of new-born children and of aged persons exhibit very opposite appearances. In congenital cases the opacity most frequently appears in the central nucleus, the interior denser structure demonstrated in the healthy lens by Petit, and is either stationary, or enlarges equally and slowly in a circle. This nucleus is sometimes not bigger than a pin's head in the centre of the transparent lens; but more commonly it is of the size of the contracted pupil, so that the child habitually knits his brows, or screens his eyes with his hand, to obtain that state of the pupil which he finds necessary to his vision. The fluid and capsular cataracts are exceptions to this observation. It is well known that adult subjects of cataract see better in moderate than in strong light, but in a much less degree; for the opacity is in them more diffused, so as very faintly, if at all, to exhibit a nucleus; and a dilatation beyond a natural one, I mean that obtained by the belladonna, though it enlarges somewhat the field of light, seldom permits of vision. The opacity commonly appears of equal consistency from the origin of the complaint, and in its progress the light is shut out from the whole sphere of the pupil. The hard cataract affords a partial exception to this remark, in which the nucleus, though imperfectly defined, is generally to be distinguished.

The opacity is sometimes simply capsular, which is known by the uniform nebulous tenuity of the opake membrane stretched over the transparent lens, and rendered more distinct by the dark tint reflected from the choroides. The cata-

are familiar to our ordinary experience. Thus we see the matter of secretions altered, loose interstitial texture consolidated by excess of deposition, or obliterated by absorption; changes, which, in lymphatic glands, and parts framed for less nice and delicate purposes than the organ of vision, are less obvious, although equally subversive of their functions.

ract appears to be prominent in the pupil, which is sometimes slightly irregular. In this case, which is considered to be an incipient state of the cataract, as by the consequent opacity or absorption of the lens it becomes more dense and distinct, the quantity of light admitted is considerable.

More frequently the opacity is simply lenticular, which is known by the cataract appearing more dense, voluminous, and varied in its colour and texture, and in relation to the plane of the iris, deeper seated; by the circularity of the pupil, and the greater degree of blindness in the natural state of dilatation. The motions of the pupil being regulated by the quantity of light which is admitted to the retina, its size depends upon the texture and bulk of the opake lens, i. e. a very dense cataract keeps it dilated by excluding light from the retina; a very bulky one by mechanically distending it. In most cases of congenital cataract, and in some of mature age, the dilatation by belladonna discovers a defined margin to the opacity, and a transparent circle beyond it, and therefore adds considerably to the patient's perception of light. I have known patients in this state, who were of an age to judge for themselves, decline the operation, content with the vision they enjoyed by the use of the belladonna. In such cases, however, a tolerable vision has been previously enjoyed, owing to the smallness of the opake nucleus compared with the transparent portion of the lens. And in all cases the vision of near objects is confused, if not totally bedimmed, by the enlargement of the pupil with the belladonna, although that of distant ones is clear and distinct. Where a transparent circumference has been discovered after dilating the pupil by the belladonna, I have never seen the capsule opake, and I believe this black rim may be considered as diagnostic of the transparency of the capsule. Where the lenticular opacity is diffused, this sign of a transparent capsule is of course wanting.

The opacity is sometimes much deeper seated, so that you look at it through the transparent capsule and lens. It is here generally circumscribed, but irregularly shaped; and often,

from its tenuity and depth of situation, escapes the observation even of oculists. This is usually considered to be a third seat of opacity, distinct from the former, viz. in the posterior covering of the lens. I do not find, upon repeated and strict examination, any proper capsule investing the lens, i. e. which admits of being removed with it. It may be necessary to a right understanding of this structure, briefly to describe it. The tunic of the vitreous humour advances to the ciliary body, there it separates into two laminæ, which, when contiguous to the margin of the crystalline, adhere closely to each other, forming the sacculated circle (canal godronné) described by Petit, which is capable of being inflated around the margin of the lens. This canal corresponds in breadth to the breadth of the ciliary processes, and is marked by them anteriorly. The anterior lamina, which is the more dense of the two, covers the crystalline in front; the posterior lines the fossula of the vitreous humour. There is no communication betwixt the canal of Petit, the vitreous humour, and the crystalline capsule. They are all distinct from each other, and must be inflated distinctly, if perfect. The crystalline, it will appear from this description, is incased in a duplicature of the vitreous capsule. The different texture of these laminæ adapted to their respective uses, (the one properly belonging to the crystalline, and supporting the whole lens in its place; the other proper to the vitreous, and covering a very small portion of the humour, which is sufficiently supported by the crystalline itself) and likewise the close investiture of the margin of the lens, which interrupts continuity, for it prevents the passage of air, explain why they are so seldom similarly affected in disease. The posterior opacity before described is therefore seated in the proper tunic of the vitreous humour. Thus much on the situations of the opacity forming cataract.

The varieties of consistency, colour, and figure, are numerous. With regard to consistency, we have the fluid or milky, the flocculent or fleecy, the caseous or doughy, and the compact or hard cataract. The fluid lens is, I believe, rarely

contained in a transparent capsule. The latter, in my experience, has been partially opake, presenting a dotted or mottled surface. The capsule appears in contiguity with the margin of the pupil, and as if projecting in it, and the opake spots upon it are most distinguishable when it is viewed laterally. The second usually resembles, in appearance, flakes of snow irregularly heaped, being visibly of a loose and broken texture, and the larger masses intersected by semi-transparent lines: the arrangement is sometimes regular and uniform, being either foliated or radiated. The capsule is sometimes semi-opake, but more frequently transparent. The third is the cataract of greatest bulk, impeding the motions of the pupil, having a heavy and dense appearance, uniformly opake, a clouded not a fleecy whiteness, and sometimes a greenish or dirty white tinge. The fourth appears deep seated, of a brown yellow, or amber colour, most dense in the centre; if entirely opake, flat upon the surface, over which the iris plays freely. The second and third species are most commonly met with; the first and fourth are comparatively rare.

The description of such appearances is difficult, and might appear over minute; but to an eye much accustomed they admit of ready distinction, and the distinction is of the highest importance, as the operation should be selected accordingly. To the first and second species, formerly regarded as incurable on account of their softness, the operation performed by the late Mr. Saunders is admirably adapted. To the two latter, the operation of couching or extraction is best suited.

In the description given the capsular opacity is not included; for when the capsule is completely opake, we can hardly judge of the texture of the lens. But where the complete opacity of the capsule exists, the lens is commonly diminished in bulk; it undergoes a waste after the opacity of the capsule, so as in process of time to become a membranous cataract. This I conceive to be owing to the obliteration of the vessels of the capsule, from which those of the lens are derived. When the capsular opacity is congenital, it is either purely capsular, or

only a very small piece of lens remains. When the capsule turns opake from injury, the lens is soon greatly reduced in bulk, as appears from the falling in or concavity of the iris which loses its support, and is demonstrated in the operation. This observation renders the operation with the needle appropriate to the cataract in which the capsule is opake, in cases which are not very recent. When the capsule of the vitreous humour is the seat of the opacity, I have not observed that the lens undergoes any diminution, nor have I yet ascertained the remediableness of this case. The membranous or purely capsular cataract is a form of the disease which appears to me to require a somewhat different operation.

The fluid cataract commonly requires only the central aperture of the capsule; it flows out into the anterior chamber, and mixes with the aqueous humour, which, by the absorption of the opake particles, in a few days recovers its transparency. It is to be observed, however, that this form of cataract requires to be treated with caution. I have seen two instances in which the simple discharge of the fluid was followed by severe inflammation, by which the process of absorption was arrested, as appeared from the permanently turbid state of the humour. This does not happen where the whole substance of the lens is changed. The milk-like fluid in these cases concealed a solid bed of lens, which, by the free laceration of the capsule, was set at liberty, and oppressed the iris.

The flocculent cataract readily undergoes solution in the aqueous humour when the capsule is freely opened, and its texture broken down by the needle.*

* The attempt to procure a solution of the opake crystalline in the aqueous humour, was suggested by an accident, in which the crystalline being wounded, became opake, and was removed by this process. I have seen many examples of the same fact. Among the miracles recorded to have been wrought at the tomb of the Abbe Paris, is the gradual restoration of sight to a young man who became blind after a puncture of the eye with an awl, which caused the discharge of the aqueous humour. (See Paley's Evidences of Christianity, vol. I. p. 380.) This miracle admits of a more satis-

While any portion of the capsule preserves its connection, it continues to be nourished, and of course, resists absorption; but an insulated portion of capsule is dissolved and absorbed, like any other matter extraneous to the circulation. These facts are ascertained by the aperture in the capsule remaining ever after unchanged in dimension, and if it be equal to the natural aperture of the iris, so that its broken margin cannot be seen in the pupil, it will always appear upon dilating the pupil with the belladonna. If the aperture be made of a given size and figure, as for example, the figure of a small diamond, in the centre of the capsule, it will ever after retain its figure and dimensions. But where the aperture is ultimately of the full size of the pupil, it is evident that the portion of capsule that has disappeared, must have undergone solution and absorption with the lens. The transparent capsule is tense and contractile as well as delicate in texture, so that a wound made in it is enlarged by the retraction of its sides; but the retraction without loss of substance would be very insufficient to account for the magnitude of the aperture, and we continually see that a mere puncture or cut of the transparent capsule, from accidents with pins and scissars, unites by adhesion, forming an opacity. In the opake capsule, which has no contractility, it is still more decidedly proved, that the aperture of the size of the pupil must be produced by the laceration of the capsule in fragments, and the absorption of these fragments together with those of the lens.

The reasons why the operation of Mr. Saunders is objectionable in the two latter species of cataract are, first, the degree of force required to break down these cataracts with the needle, sufficiently to undergo a quick solution in the aqueous fluid; and secondly, the danger of dislocating the lens in the attempt. If the operation upon a cataract of firm consistence is conducted with the caution which experience dictates, the process of solution is tediously slow, and the operation must

factory explanation than has yet been offered, as the familiar case of a cataract formed by the wound, and undergoing absorption.

be repeated many times; but this is the least evil. If the operator, after having opened the capsule in the centre, acts with the same freedom as upon the soft species of cataract, the unsupported lens falls forward, or revolves and turns edge foremost in the pupil, so as to put the iris on the stretch; or it passes entire into the anterior chamber. If he succeed in dividing it, large and solid masses will press upon the iris, wedge in the pupil, or pass into the anterior chamber, and the consequences be the same in kind though less in degree. Even where the operation is confined to the aperture of the capsule, and the lens has been scarcely touched, I have known the eye destroyed by the accidental falling of the lens through the aperture and pupil into the anterior chamber; a slow inflammation of the iris ensues, which not only produces the most distressing symptoms, but admits of little, if any alleviation, until the mechanical pressure is taken off. This event, so much to be desired, is unfortunately protracted, for the process of solution is arrested by an adventitious coating of lymph, which is effused by the inflamed vessels, and invests the extraneous body. This lymph becomes partially organized, and the case terminates in obliteration of the pupil and anterior chamber, or by the sympathy of the retina with the suffering iris and choroid, in incurable amaurosis. Having more than once observed the protrusion of the lens, and the consequent inflammation of the iris to ensue, where I had studiously endeavoured to prevent it, I was led to suppose this might be owing to the previous dilatation of the pupil by belladonna, by which the lens was deprived of support. I therefore omitted the previous use of the belladonna where the cataract was substantial and firm. It was then applied to the eyebrow an hour or two after the operation, with a view of preventing the adhesion of the pupil to the capsule of the lens; but under the influence of the belladonna, I repeatedly observed, that the unsupported lens came forward, and the symptoms of pressure commenced. I therefore deferred its employment until a time sufficient had elapsed for the renewal of the aqueous humour, which, I con-

ceived, might resist the pressure of the lens. By this precaution the accident was effectually prevented, no symptom of inflammation followed, and the advantage of keeping the pupil circular was equally obtained. It may be right to observe here, that when the belladonna is used with this view, the interval of its application should be sufficient to admit of the recovery of the pupil, or it will be permanently dilated. With every precaution, however, the operation with the needle upon the full and firm cataract, is either distressingly tedious, or what is more to be objected to, destructive to the organ, and very trying to the health and spirits of the patient. In such cases I have, therefore, relinquished the operation, which was very ingeniously conceived, and for its simplicity appeared to me to deserve a full and fair trial of its merits. It is due to the projector of the operation to state, that its superiority was distinctly asserted by him only in the cases of soft and capsular cataract, as may be seen by a reference to his essay on that subject, in his posthumous work edited by Dr. Farre. At page 173 of the volume referred to, the editor observes, "In the adult, if the texture of the lens is nearly uniform and permeable, the cure is completed in a space of from three to five months; but if the texture is firmer and the nucleus large, the cure cannot be accomplished in less than seven months. On this account the author, who thought highly of extraction, and performed this operation with dexterity and success, was inclined to extract the lens when its texture was unusually hard. The editor cannot assert that he would ultimately have conceded thus much in favour of extraction. It was intended that such decision should result from a very long and impartial trial of both operations. With respect to the softer lens, or the capsular cataract, he was satisfied of the superiority of his operation."

In performing this operation for the soft cataract the operator may pass his needle through the cornea or the sclerotic. The former mode commands the advantage of giving no pain, exciting but slight inflammation, and ensures the laceration of

the transparent capsule, which is sometimes so elastic that the operator, whose eye is not well accustomed, is in danger of not opening it in the centre, or of wounding the interior surface of the cornea. This is especially to be feared in operating behind the iris, when the lens is, at the same time, much diminished by absorption, as in children; so that the capsule moves before the needle instead of resisting it. Few cases of lenticular cataract occur, to which this method is appropriate, and in which it is adviseable to perform the posterior operation. There is more pain, more inflammation, more danger of displacing the lens than in the operation through the cornea. But when the capsule is opake and the lens diminished in bulk, either spontaneously or in consequence of former operations, so as to have receded from the pupil, the posterior operation is more eligible, as the operator readily ascertains the effect of the needle upon the capsule, and directs its movements to the best advantage; while the inflammation is always moderate in proportion as the lens is small. Indeed, in the purely capsular cataract of the adult, and the half absorbed cataract of children, it is so slight as scarcely to confine the patient. When a cataract of firm consistence has undergone a partial absorption from one or more operations with the needle, and still does not readily separate into fragments, the introduction of the needle, posterior to the iris, gives the surgeon the advantage of couching it. This I have often done, to the great satisfaction of the patient, who escapes, owing to the diminished bulk of the lens, the inflammation which occasionally follows the primary operation of couching. It was my intention to point out the circumstances which should determine the election of couching or extraction in the two latter species of cataract, and to shew the value of these operations relatively to each other and to that by solution, as the deliberate result of an impartial investigation of all. This I shall make the subject of a future communication.

SELECTED REVIEWS.

Practical Observations on the Treatment of the Diseases of the Prostate Gland. Illustrated by Copper-Plates. By EDWARD HOME, Esq. F. R. S. Serjeant Surgeon to the King, and Surgeon to St. George's Hospital. 8vo. pp. 360. London, Nicol, 1811.

[From the London Medical Review, for January, 1812.]

THE frequency and importance of diseases of the urinary passages, the insufficiency of the means employed for their cure, and the unchecked course which many of them hold to a fatal termination, have rendered them at all times subjects of much interest. But it is not until comparatively recent times that any thing very material has been added to our knowledge of them, or much improvement introduced into the mode of treatment. A subject which has engaged the particular attention of such men as Hunter and Desault, cannot but have been illustrated by their researches. In this country Mr. Hunter was perhaps the first who led the way to a more scientific mode of treating many of those disorders, by his valuable observations in his Treatise on the Venereal Disease. In France the subject has been taken up by Desault, who appears to have prosecuted his inquiries with the same ardour that characterised all his labours for the improvement of surgery. Of the surgeons of the present day, there is no one to whom we are more indebted for an extension of our knowledge of diseases of the urinary passages than to the author of the work before us. Mr. Home has had the advantage of a very ample experience, and it has evidently been with him a subject of particular study.

The first part of this volume consists of a republication of a paper read before the Royal Society, and thought worthy of being published in their Transactions. It contains an ac-

count of a middle lobe of the prostate gland, "which," says Mr. Home, "I had recently discovered," and "which, from the obscurity of its situation, had hitherto escaped observation."

It has been often observed that, in the latter periods of life, the prostate gland becomes more or less enlarged, forming tumours projecting into the bladder; and that the most frequent form is that of a small rounded tumour immediately behind the opening of the urethra. Mr. Home quotes Morgagni as having noticed this tumour, and adds, "it is evident that Morgagni had no idea there was any conformation of the prostate gland that could account for this tumour, and believed that it arose from the surface of the body of the gland."

The passage from Mr. Hunter, which Mr. Home introduces, is very expressive of the appearance of the tumour. "Besides this effect of the lateral parts swelling, a very small portion of the gland, which lies behind the very beginning of the urethra, swells forward like a point as it were into the bladder, acting like a valve to the mouth of the urethra. It sometimes increases so much as to form a tumour projecting some inches into the cavity of the bladder." It is added that Mr. Hunter did not prosecute the inquiry.

Mr. Home's attention was directed to this subject more particularly, from finding this "nipple-like process" very prominent in a person who had died from the disease of this part, and a bridle, extending from the middle line of the tumour to the bulb of the urethra, where it insensibly disappeared. The veru montanum, somewhat wasted, was concealed in the fold forming this bridle, which appears to have drawn the bulb towards the tumour, and shortened the membranous part of the canal. Struck with this appearance, which he supposed to have been unnoticed by others, he was led to consider it with attention. In order to satisfy himself whether this tumour arose from the disease of any distinct portion of the prostate, sufficiently detached to move independently of the rest, he

thought it necessary to examine the gland accurately in its natural state.

Mr. Brodie, as usual, undertook the dissections. In the angle between the two posterior lobes of the prostate gland, lying between the two converging points of the vasa deferentia and the bladder, and adhering to the latter, he found a small rounded substance, resembling in appearance one of Cowper's glands. It could not be detached from the contiguous lateral portions of the prostate, and yet was sufficiently distinct to be considered as a separate gland. By other dissections it was proved to be a lobe of the prostate, the substance being continued from one to the other, on the side next the bladder, but rendered a separate lobe by two fissures on the opposite surface. It was found to vary much in size in different subjects, in some being scarcely distinguishable as a glandular body; in others it was larger, more defined, and evidently blended with the lateral portions of the gland. No anatomists, he adds, have pointed out this lobe, and therefore, in whatever way they have described the vasa deferentia to pass into the bladder, they have neither anticipated, nor thrown any light on the present inquiry with regard to the middle lobe; either with respect to its natural form, or the regularly rounded shape it preserves in the different stages of its enlargement.

In the plate annexed, this middle lobe is represented as very distinct, and larger than we shall generally find it. It is certainly in some cases scarcely to be made out as distinct from the firm and dense tissue which unites the lateral portions of the prostate; and, where most distinct, it is closely united with them.

There is an unnecessary degree of parade in the manner in which this discovery is announced, especially as it was very generally known by all who had examined the structure of these parts, that there was a portion of the prostate gland, which lay behind the openings of the converging vasa deferentia, and between these and the bladder. Our readers will perhaps think still less of this great discovery, on perusing the

following passage from Morgagni. "Quod si vera ulla propago prostatæ addenda est, ea certè est *subrotunda et renitens quasi glandula*, quam cum sæpe diligentissimus incisor noster in publicis dissectionibus animadvertisset *inter vesicam, et seminales capsulas, qua sese mutuo hæ jam contingunt, prominentem, et nonnunquam ad angulum quem, conveniendo, efficiunt, prostantem*, nos accurato instituto examine nihil aliud esse comperimus quam corporis ipsius prostatæ particulam, non sine aliquâ fortasse in iis qui hanc habent (neque enim omnes habent) utilitate, ut puta ad easdem capsulas a compressione distentæ vesicæ defendendas, aut alia ejuscemodi, *inter hanc atque illas protuberantem.*"*

No one from this description can doubt but that the "prostatæ propago," the "subrotunda and renitens glandula," of Morgagni, and "the small rounded substance imbedded between the vasa deferentia and the bladder," the small middle lobe of the prostate of Mr. Home, are one and the same. The figure and precise situation are well described by both, and cannot be mistaken. Morgagni thinks it is not always present; and Mr. Home, in one of the five dissections, says, that there was no apparent glandular substance, but a mass of condensed cellular membrane. Morgagni, and his "diligentissimus incisor," may in this instance be compared to Mr. Home and his indefatigable dissector. It thus appears, that what has been registered in the Philosophical Transactions as a recent discovery of Mr. Home's, was well known in the time of Morgagni, and demonstrated often in public dissections.

That Morgagni was well acquainted with the diseased enlargement of this part is no less evident. In all his dissections we find particular mention made of the prominent feature of this disease, the roundness of the tumour under different de-

* Adversaria Anatomica, iv. 14. And in another place, describing an enlargement of the prostate, he says, "ejusdem glandulæ subrotunda propago, in adversariis memorata, medium pariter posteriorem summumque locum tenebat."

grees of enlargement. The situation he assigns to it is precisely the same. The "protuberantia subrotunda, mediocris uvæ acini magnitudine, intimâ tunicâ vesicæ obducta,"* answers well to the "nipple-like projection, pushing before it the membrane of the bladder."

Another appearance also, that of a fold or bridle, extending from the nipple-formed process to the veru montanum, which Mr. Home supposes to have been unnoticed, is described by Morgagni.† This is not the place to multiply quotations from a book so well known, and in almost every one's hands, or it would be easy to prove that Morgagni was acquainted with the figure of the tumour, and the part of the gland from which it proceeded: that he well knew that the tumour was formed by the enlargement of the substance of the gland, and not by any excrescence of a different nature from its surface; and that he was aware of many of the phœnomena of the disease during life, and of its being a disease of persons advanced in age.

We should not have noticed this part of the work so much at length, nor perhaps entered at all on the discussion of a point of so little consequence, but that Mr. Home evidently attaches much importance to his discovery, and takes exclusive merit to himself for having made it. It is more than probable that Mr. Home was unacquainted with the passage quoted above, from Morgagni's Adversaria. But at least it was incumbent on him to have examined the writings of this most accurate anatomist with a little more care than he appears to have done, before he asserted that Morgagni had no idea of there being any conformation of the prostate gland which could account for this tumour; and that no anatomist had anticipated himself, either with respect to the natural form of

* Epist. Anat. Medica, xli. 18. See also Epist. xli. 6, 17, 19. xlii. 24. xlvi. 5 to 13, where many older authors are quoted as having described this disease: Lieutaud Memoires de l'Academie des Sciences, for the year 1753, and Deschamps traité de la Taille, Tom. i.

† Epist. Anat. Medica, xxxvii. 30.

the lobe, or the regularly rounded shape it preserves in the different stages of its enlargement.

The enlargement of the middle lobe being the impediment to the passage of urine, Mr. Home's observations are principally directed to it in the present inquiry. Enlargements of other parts of the gland often form an obstacle to the passage of instruments into the bladder, from the alteration they produce in the course of the urethra, but they are not regarded as immediately obstructing the passage of the urine.

In the inflammatory enlargement of the prostate in earlier life, in consequence of strictures, the middle lobe is said to be but little, if at all, affected. And as the strictures are removed, the swelling gradually subsides. In persons advanced in years, the middle lobe participates in that general enlargement of the gland which so very frequently occurs. In Mr. Home's opinion, few arrive at the age of eighty without, in some degree, experiencing it.

As the middle lobe enlarges and presses on the bladder, it brings on much irritation, and an inflammation, which contributes to the farther swelling of the gland.

"The middle lobe projects into the cavity of the bladder, in the form of a nipple, pushing the membrane before it, so as to put it still more on the stretch, in the direction from the urethra to the veru montanum. In its further increase it loses the nipple-like appearance, becoming broader from side to side, and forms a transverse fold by pushing forward the membrane, connecting it to the lateral lobes, which also become proportionally extended. As the tumour and transverse fold are situated immediately behind the orifice of the urethra, they are pushed forwards before the urine, in every attempt that is made to void it, acting like a valve, and closing up the opening, till the cavity of the bladder is very much distended; when the anterior part of the bladder being pushed forward, and the tumour being drawn back in consequence of the membrane of the posterior part of the bladder being put on the stretch, the valve is opened, so that a certain quantity of

water is allowed to escape, but the bladder is not completely emptied."

The history of the symptoms of this disease is very faithfully given, and will be at once recognized by such as have witnessed the calls to make water becoming daily more frequent and distressing, and the efforts at relief more violent, until a complete retention takes place. The symptoms, in truth, are well known; and Mr. Hunter in describing this disease, supposes them to be so, when he says, " it will be unnecessary to relate the particular symptoms which this disease occasions; they are such as arise from any stoppage of urine, producing an irritable bladder."

The quantity of urine retained gradually increases, but as the patient still continues to pass a little at every attempt, surgeons have committed the mistake of supposing the bladder to be incapable of containing more than an ounce or two of urine, and to be emptied at each effort. This is a mistake of much importance, and one which diverts the attention of the surgeon from the only effectual means of relieving the disease. It is briefly noticed by the author.

In addition to the projection of the middle lobe, the lateral portions of the gland, in the latter stages of the disease, frequently project into the bladder to a great degree, presenting a convex surface to the canal of the urethra, the course of which is materially altered. Mr. Home has in no instance observed this projection in the right lobe. The surfaces of the tumours become in some cases excoriated, and put on the appearance of being ulcerated.

The irritation of the gland in many cases produces a copious secretion of a very tenacious mucus. It is sometimes so abundant as nearly to equal in quantity the urine that is voided, and of so irritating a nature as to cause much pain in the urethra, from its passage.

As the disease continues, the internal membrane of the bladder becomes generally inflamed, and we find in the urine shreds of lymph, a white powdery sediment, and in some

cases pus, secreted by the mucous membrane of the bladder. The muscular fibres do not relax to their full extent, and when the bladder contains but a moderate quantity of urine, the most violent involuntary action is often induced. Where the obstruction is such as to allow the greater part of the urine to pass, the symptoms continue nearly the same for months; in some cases they even abate from the decreased sensibility of the bladder; and a larger quantity can be retained, without bringing on symptoms of distress.

Among the consequences of this enlargement of the prostate is the formation of a stone in the bladder, and an impediment to the exit of any which may have passed down from the kidneys. The projection of the prostate raises the sound over a small stone, so as to prevent its being felt. Such cases are, we believe, in old persons, not uncommon. Mr. Hunter mentions the case of a gentleman that had been often sounded for a stone, and yet no stone could be found: but it afterwards appeared that there was a stone, which, together with the swelling of the prostate gland, had been the cause of his death. Such cases are noticed also by others.

It appears in another part of this volume, that Mr. Home has succeeded in discovering a stone which could not be felt by the common staff, by means of an elastic gum catheter, and that he always employs it for this purpose. As it empties the bladder, it brings the stone gradually towards the instrument; and Mr. Home says, he has felt it grating against the eyes of the catheter. On the strength of this evidence he has performed the operation in a case in which two other surgeons were unable to detect the stone. The operation was successful, and the patient restored to health. Mr. Home does not say that he has ever succeeded in detecting a stone, in the complicated cases above noticed, by means of the elastic gum catheter, but we certainly consider it, when of considerable length, to be an instrument excellently adapted to this purpose, and one by means of which we may hope to succeed when others fail. Where the stone is the first formed disease,

patients have been for a time "relieved from all the symptoms, by an enlargement of this part of the prostate gland preventing the stones from falling down upon the neck of the bladder, and irritating those parts." These are the words of Mr. Hunter. The same fact is adverted to by Mr. Home.

In patients labouring under the diseased enlargement of the middle lobe, there is generally a less quantity of urine secreted than during health; and as the bladder is relieved, the secretion increases. The diminished secretion, Mr. Home supposes to proceed from the continual pressure on the mammillæ of the kidney, by the urine which is prevented from readily entering the bladder. In more violent cases, in which the patient dies from retention of urine, Mr. Home thinks it probable that the secretion is stopped altogether from the same cause. The symptoms observed in persons who die from retention of urine, certainly very much resemble those observed in persons who die from a suppression of urine, in whom no urine is found in the bladder, during the illness or after death. This makes it reasonable to conclude, that in cases of death "from complete retention in the bladder, the pressure of the urine against the mammæ stops the secretion in them; were that not the case, the bladder would be ruptured or greatly distended, which does not commonly happen. Of this fact I have had abundant experience."

We are next led to consider the mode of treatment of cases of enlargement of the middle lobe of the prostate gland. On this point Mr. Home's observations are very valuable. They are made by a person familiar with the symptoms of the disease, and accurately acquainted with its nature. And the very rational mode of treatment which he recommends, and the success which appears to have attended it, are at once proofs of his judgment and of his skill. Although other surgeons may have been acquainted with the disease, and the means of relieving it, Mr. Home is the first who has well explained and insisted on the plan of regularly emptying the bladder in order to remove it. It is true that Desault, in similar cases, strongly

recommends the use of the elastic gum catheter, which he leaves in the bladder for a very considerable time, advising the occasional use of it, even after the cure appears to be complete. But he does not appear to us to have possessed such accurate notions of this diseased enlargement as Mr. Home, though his practice may have been equally successful.

The diseased enlargement of this lobe, when arrived at a great size, is allowed by every one to have gone too far to admit of a cure; and it is very generally believed, that the disease is equally desperate in all its stages. One object of the present work is to do away this prejudice, and to show that, if attended to in proper time, the enlargement may, in many instances, be reduced, in others prevented from increasing, and, even in less favourable cases, rendered so much slower in its progress, that the patient's life is prolonged, and his sufferings mitigated in a very great degree.

In the earlier stages he recommends bleeding from the loins, opiate clysters, Dover's powder, the tepid hip bath; and, with these, general quietness and abstinence. On no account should bougies, or catheters be introduced, especially of the metallic kind; they add to the irritation and increase the swelling. The symptoms in this stage are often supposed to arise from stricture, and bougies are employed to relieve them. It is true, that from the irritation we may find a spasmodic stricture. But if the patient is old, and has not had strictures in earlier life, we may be sure, says the author, that none exist now. If the frequency of making water increases, and the efforts become more violent, and if at the same time there is any fulness, or tension of the bladder, a catheter should be introduced.

In passing the catheter in these cases, we are directed to keep three objects in view; to avoid bringing on a spasm in the urethra; to conduct the point over the prominence at the neck of the bladder; and to employ an instrument which may be safely left in the bladder. The only instrument possessing the necessary qualities to fulfil these objects, is the elastic gum catheter. Mr. Home considers the introducing into general

practice the use of a curved elastic gum catheter, as a point of very great importance. In order to give them the proper curvature, he always keeps them on a curved iron stilet, with the curve continued to the point, and more bent than the silver catheters generally are. In some cases a catheter with a stilet cannot be passed from spasm, and yet, without a stilet, if it has not a permanent curvature, it cannot be made to mount over the obstruction at the entrance into the bladder. When the surgeon has not elastic catheters with a permanent curve, he is advised to employ one with a leaden stilet, which will give support sufficient to get over the obstructions, and which may be removed when the instrument is in the bladder, with less injury to the prostate and parts around.

When a curved gum catheter cannot be passed, either with or without a leaden stilet, we should employ one of iron; and in order to give a still greater curvature, withdraw it a little as the point of the catheter arrives at the neck of the bladder. There are some cases where a metallic catheter will pass more readily than any other, but in general, a flexible one should be employed, if possible, to prevent injury of the projecting tumour of the prostate.

"The catheter should be introduced either towards the right or left side, with the handle nearly in a horizontal line, and when it reaches the membranous part of the urethra, the handle should be gradually and gently brought towards the perpendicular line, the point all the time being kept in motion; and when it is nearly upright, the handle should be depressed. Where the flexible catheter has no stilet, a good deal of dexterity is often required. The great advantage of passing the instrument in a lateral direction, is, that the point is by that means guided into the space between the lateral and middle lobe of the prostate, where there is a groove along which it may be directed between these two projecting parts into the cavity of the bladder." Where the point gets entangled in the membranous fold between the two lobes "there will be an advantage in partly withdrawing the instrument, and trying to

introduce it on the opposite side, where the same thing may not occur."

If there is much difficulty met with in passing the instrument, Mr. Home gives many reasons for leaving it in the bladder; he generally withdraws it every three or four days. In the temporary paralysis of the bladder which sometimes follows, he advises the urine to be drawn off at very short intervals.

Enough has been said to show, that the author's directions, with respect to the choice of the catheter and mode of introducing it, are of much value. They come from one who has had on this subject a most extensive experience; and if not wholly new, are scarcely less valuable on that account, as they confirm many observations made by other practical writers. Mr. Home has the reputation of having succeeded where others have failed; and it is evident that he supposes himself to possess "the nicety and lightness of hand so necessary for passing the catheter." "An eminent engraver, on whom I passed a catheter, after unsuccessful attempts had been made by others, told me that he saw by the light mode of handling the instrument, that I was master of it."

In cases of retention from enlargement of the middle lobe, the object is to disturb it as little as possible, till the inflammation and swelling have subsided, and there is a free passage for the urine. The most effectual means of cure is to evacuate the urine regularly, by means of the catheter. When this practice is well followed up, Mr. Home says, that the swelling in very many instances has subsided, and the power of evacuating the bladder has been restored. The time in which a cure has been obtained varies, according to his account, from days to years. In people much advanced in years, a cure is not to be expected; but, by regularly passing a catheter, the disease has been kept stationary, so as not to be the cause of death, and not to be attended with pain or distress. No other means are of any great service. Mr. Home does not look on this tumour as a new formation, but only an increase of a na-

tural part, such as an enlarged tonsil; and often, by removing the inflammation, it subsides.

Persons who have had strictures from their youth remaining uncured, are more liable to this enlargement than others. The symptoms are nearly the same as when no stricture is present. In such cases the bougie must not be passed far beyond the strictures. When the canal is large enough, a catheter is to be introduced, and the urine regularly drawn off. Mr. Home has never been able to accomplish a complete cure of the stricture, the contraction returning on the recurrence of any irritation at the neck of the bladder. The caustic bougie seldom can be employed with any advantage.

The lateral lobes of the prostate are liable also to independent enlargements. Mr. Home gives two instances where the left lateral lobe was enlarged and pressed on the rectum. The symptoms were such as arise from an impediment to the free passage of the fæces, and were referred to the rectum itself. There appeared to be no increased sensibility of the gland. The object is to relieve the part from pressure, as in the cure of the enlargement of the middle lobe. Mr. Home employs clysters of warm water, suppositories of hemlock, with or without opium, and the tepid hip bath.

An inflammation of the veru montanum is, according to Mr. Home, no uncommon disease. It produces most distressing sensations. The disease generally continues for years. Slight cases have got well, but generally the parts do not recover. It has been frequently mistaken for stricture. This is an important error, as bougies are said always to aggravate the disease, and in many instances to cause it. Many of our readers will here probably recollect the admonitions delivered by Mr. Abernethy, in his truly valuable Observations on Diseases of the Urethra; when, in speaking of diseases of the prostatic part of the canal, he cautions "the younger part of the profession to beware, in their attempts to cure strictures, that they do not irritate nor injure the last inch of that canal, where there are no strictures, but in which considerable dis-

order may nevertheless exist." Mr. Home says that he has found no remedies of much permanent use. The patients are relieved by keeping the horizontal posture. He endeavours to quiet their apprehensions as to its being a disease of any danger; and in some cases it has gradually but very slowly subsided.

The other diseases of the prostate noticed in this volume are abscess and ulcers in it, and the deposition of gravel in its substance. The observations on them contain nothing of particular interest. As the best distinguishing mark of disease and ulceration of the prostate, Mr. Home mentions the continued discharge of a glary tenacious mucus. The best mode of treating it is to prevent the urine from coming upon the surface of the ulcer, by keeping a catheter in the bladder.

Mr. Home relates, in the course of the work, a case of irritable bladder, in which various injections into the bladder were employed, but without ultimate relief. Oil appears for a time to have had the effect of calming the spasmodic action which generally followed drawing off the urine. Opium dissolved in water afforded also a little relief.

One of the most important parts of this volume consists of a series of engravings, thirteen in number, twelve of them representing the changes which the middle lobe of the prostate undergoes in the different stages of its enlagement. They convey very correct notions of the figure of the tumour, and the changes it produces in the course of the urethra. They are all supposed to be taken from the front, and exhibit the parts as undisturbed by the knife. We think two or three views of vertical sections of the tumours in their different stages, including a small portion of the urethra, would have added to their utility, as pointing out still more clearly the part of the prostate which enlarges, the exact nature of the obstruction which it causes, and the altered course of the passage in the vertical direction. They are rendered still more valuable by a copious and connected explanation of the whole from Mr. Home, and by many of the cases being narrated in the preced-

ing part of the work. In this great city, all who are desirous may have access to excellent museums, and have every facility of examining diseased appearances. To these, drawings are of minor importance. But we cannot too strongly praise the plan of illustrating diseases, attended with evident morbid structure, by a well selected series of plates, as it is extending in some degree the advantages of a museum to many who have neither the means nor the opportunity of personal inspection. They so much simplify and elucidate verbal histories, and leave an impression so much stronger than the best written description, without such accompaniments, can do, that we do not hesitate to rank them as means of very great utility in promoting a more general and a more accurate knowledge of disease.

The rest of the work is occupied by voluminous tables of the quantity of water drawn off from two patients who laboured for a considerable time under a disease of the prostate gland. "They are intended to show the irregularity of the secretion of the kidneys, in what may be considered as a state of health respecting these organs." The latter point may, we think, well be doubted.

Most of the observations in this work are founded on experience; and are confirmed and illustrated by cases and dissections. These we regard as a very valuable part of the volume, as conveying much useful information, and entering into many details which could not be so well delivered in general precepts. And it may be said, that in most instances in which we have general histories of diseases followed by the relation of cases, that it is from the latter the truly attentive reader derives the most accurate and therefore the most useful knowledge. This, we think, will be admitted by those who have sought to obtain a more intimate acquaintance with the distinguishing symptoms of diseases, by comparing written accounts with what they observe during their actual occurrence.

There is an air of importance and authority in Mr. Home's

style of writing, which must always be displeasing to such as value a book more for the matter it contains, than for the name of the author who composed it. This spirit is to be traced in some parts of the present work: but it appears to arise from a consciousness of his knowledge of his subject, a knowledge which in this instance we believe he eminently possesses. We submit to it therefore with far different feelings from those we have experienced in examining some of his physiological speculations.

Surgical Observations on Tumours, and on Lumbar Abscesses. By JOHN ABERNETHY, F. R. S. &c. pp. 222. London, 1811.

[From the London Medical Review, for October 1811.]

THE word, tumour, Mr. Abernethy confines to such swellings as arise from some new production which made no part of the original composition of the body; and by this definition he excludes from his arrangement the majority of those diseases which nosologists have placed under this title. Tumour has generally been understood to designate any preternatural enlargement discoverable in any part of the body, and it has therefore included those growths of bones, joints, glands, &c. which would otherwise find no station in nosology, although they may justly be considered as morbid affections. Mr. Abernethy's definition cannot therefore be said to comprize the whole class, but merely a particular order, of which he has pointed out the species and varieties. Indeed it is not a little curious to observe the different significations in which modern writers have employed this word tumour. Mr. John Bell defines a tumour to be, "a mere accretion of nutritious particles in skin, bone, gland, or muscle, according to the nature of the part;"* whilst Mr. Abernethy applies that term exclu-

* Bell's Principles of Surgery, Vol. 3. p. 18.

sively to diseases of an opposite origin, namely, to such growths as formed no part in the original composition of the body.

We are obliged also to dissent from the doctrine which Mr. Abernethy has espoused, as illustrating the formation of morbid growths. Mr. Hunter found a clot of blood adhering to the surface of the peritoneum, by a slender neck half an inch in length; and Mr. Abernethy having met with a pendulous fatty tumour growing from the same membrane, concludes that it originated from a similar extravasation. The vessels are supposed to have shot through the narrow neck, and organized the clot of blood, which thus becomes a living part and increases to an indefinite magnitude. Now, however imperfect our evidence may be, to prove that extravasated blood never becomes the matrix of vessels, we must assert, that we do not know a single circumstance which substantiates the opposite opinion. If extravasated blood ever becomes the matrix of vessels, we should not expect to find it so universally and completely absorbed in the cavities of aneurismal sacs, and in extravasations in general; but should rather expect that such depositions would become living parts, and grow to indefinite magnitudes; whilst the vessels that shot into them would determine the nature and progress of the organization which had thus become established. But the fact is, that effusions of coagulated blood, instead of becoming organized, produce the same effects in the animal body as foreign substances in general. If in moderate quantity, they are generally and speedily absorbed, but if to a greater extent, or diffused amongst the surrounding parts, a degree of irritation is excited which terminates in suppuration, and the extravasated fluid is thus discharged. Besides, the common means of detecting organization, discover no vascularity in these depositions, even in their most concentrated state, and when they may be supposed to have existed a considerable time, and in contact with living parts. It is impossible to inject the firm and fleshy coagula of an aneurismal sac, and if an amputated limb be

minutely injected, it will be impossible to detect organization in the plug which extends from the end of the vessel, whilst the lymph effused from the edges cut by the ligature will be red and highly vascular. If the time then have been sufficient for the propagation of vessels in the effused lymph, we think it but fair to conclude that the same changes would have taken place in the plug of coagulum had it admitted of them; and the rapidity and uniformity of the absorption of this plug furnish to our minds some evidence in favour of its non-vascularity.

Neither physiology nor animal chemistry have yet pointed out the difference between that lymph of fibrine which is deposited by extravasated blood, and that effusion which takes place from wounded or ulcerated surfaces. The peculiar organization and changes which are however indispensably requisite for the production of the latter, would indicate that it is widely different from that deposition which is the result of simple extravasation. The constancy and rapidity with which vessels are propagated into the lymph which is secreted during inflammation, are evinced both in the union of divided parts and the formation of granulations; whilst extravasated coagulum not only interrupts these salutary processes, but even will exist for a great length of time without affording the least evidence of vascularity. It is that lymph, therefore, which is secreted during inflammatory action, that appears to us to form the sole matrix of vessels, and if we can but imagine it effused into the cells and cavities of the body, we shall at once arrive at the origin of morbid growths. The structures from which the vessels are propagated determine the organization of the lymph, and the tumour generally partakes of the structure of the parts from whence the vessels originate: thus, in the adipose membrane fatty tumours are formed; in the neighbourhood of bones, osseous ones; of joints, cartilaginous ones, &c.

If we consider the healthy structure of the parts in which tumours arise, we shall be able to account for many circum-

stances in their formation; for morbid growths cannot but be regarded as accumulations of natural structure modified by peculiar actions. Tumours which form in glands approximate to the structure of those organs, being generally firm, solid, and highly vascular; whilst those that originate in the cellular membrane are frequently cystic and divided by septa. It appears to us, that an examination of the different tissues in which tumours grow, will better explain the formation of cysts, than any arguments which can be deduced from the effects of pressure, since there are often tumours of immense size and great weight which are involved in no cyst. Many also of inconsiderable size are contained in strong coats, which appear to us to have their origin from the peculiar structure in which the nucleus of the tumour was deposited.

The prolixity of these observations will be forgiven by those who attach any importance to the medical treatment of these diseases. We have seen that their origin is in an inflammatory action, producing an effusion of lymph; and hence their treatment must consist in obviating this increased action, and subsequently exciting the absorption of the matter already deposited. The diminution of arterial action, by the abstraction of blood and heat, will be found best calculated for the fulfilment of the former object, and the latter is to be effected by the use of stimulants and counter-irritants. The *timing* of these, however, is a matter of considerable difficulty and of the utmost importance; for, if employed before the inflammatory action has fully subsided, they will increase rather than diminish the accumulation. "Both reason and experience equally demonstrate the impropriety of using the stimulating plan, till the disease is first tranquillized and in a degree subdued. It is reasonable to expect the stimulating measures will increase the actions, which are going on in the diseased part; and experience proves that diseases are often increased by those very means which, had they been employed at a proper time, might have effected their cure."

That class of tumours which consists of substances of new

formation, which made no part in the original structure of the body, is divided by Mr. Abernethy into two orders; *first*, sarcomatous tumours, or those which have a firm and fleshy feel; and *secondly*, encysted tumours, or those which consist merely of a cyst or capsule with a fluid deposited in it.

The first order is subdivided into numerous species. The first is termed common vascular or organized sarcoma, and is composed of lymph, rendered more or less vascular by the growth of vessels through it. This appears to be the most simple form of tumour, and is only dangerous from its growth and size, when, inflammation being the effect of the distention and pressure and the tumour possessing but slight powers to sustain disease, it sloughs and falls out. The second species is the adipose sarcoma, which consists of a fatty or lardaceous substance, contained in a thin but distinct capsule; it generally forms in the midst of cellular or adipose substance, and is often lobulated in its appearance. These tumours have appeared to us to consist of fat deposited in a cellular structure, probably the common reticular membrane, which naturally contains a serous fluid. The whole is then contained in a slender cyst, which does not appear to partake of the diseased action, for if the included substance be removed the cyst will adhere and so swell. They are very loosely connected with their capsules, and hence their removal is easily effected, since the latter do not regenerate the disease. The third species is denominated pancreatic, from its resemblance to the structure of the pancreas. It occurs generally in the neighbourhood of salivary glands, or such as are of a similar structure. It is of slow formation and generally very indolent in its nature; at other times, however, it will excite pain and inflammation, which confound it with schirrus.

Cystic sarcoma is the fourth species; it consists of a number of cysts containing a serous fluid, and resembles the section of a healthy ovary in appearance: it generally forms in the ovary and testicle, and in the latter often contains a caseous matter. Mammary sarcoma, the fifth species, is white,

firm, and homogeneous in its appearance, like the gland from whence it is named; it possesses no cyst, extends considerably into the surrounding parts, and appears very intractable in its nature. The sixth species, the tuberculated sarcoma, is very horrible in its progress and effects; " it consists of an aggregation of small firm tubercles of different sizes and colours, connected by a kind of cellular substance; the size of the tubercles is from that of a pea to that of a horse bean, or sometimes larger; the colour of a brownish red, and some are of a yellowish tint." The primary tumour generally forms in the neighbourhood of lymphatic glands, but innumerable smaller ones afterwards grow on the surface of the skin and are extremely hard and painful. At length a foul ulceration supervenes, very similar to the cancerous, with thick inverted edges and an ichorous discharge. The tumours in some parts are confluent, and here ulceration generally commences. We have recently met with them, not only on the surface of the body, but also in the liver and on the peritoneum, in the same subject; it is extremely malignant and destructive.

The sarcoma next described, the seventh species, has been by some called the soft cancer, and by others it has been included in the comprehensive name, fungus hæmatodes. It differs, however, in many respects from cancer, and we conceive can only be regarded as one of the varieties of fungus hæmatodes. The chief characteristic of the disease is its anatomical structure, which very nearly resembles that of the brain. The primary tumour has generally its situation near the surface of the body, and very frequently in the testicle, and glands about the neck and head. The disease spreads in all directions, and the glands secondarily affected, are generally converted into a structure resembling the primary tumour, but of a much softer consistence and apparently less vascular. They often contain a creamy fluid, which is deposited in a flocculent tissue resembling, after maceration, an unravelled testicle. The primary tumour will frequently ulcerate and throw forth a bleeding fungus, but we have never met with this

result in the secondary appearance of the disease, in which the skin generally ulcerates from distention, the tumour sloughs and is discharged. It appears to be propagated in a peculiar manner and independent of absorption; for we meet with the secondary tumour in a part which has no possible connection by absorbents with the one primarily affected. Thus we have known the eye the seat of the primary disease and the lungs secondarily affected; the testicle is its most frequent seat, and the liver will exhibit the next scene of its ravages. The parts secondarily affected differ very much in appearance from the primary tumour; the latter is often much firmer in consistence, and will contain cysts or cavities filled with a glutinous fluid, whilst the former are converted into a medullary substance, in many parts of a consistence not much thicker than cream. Thus, like cancer, the glands secondarily affected do not always possess the characters of the primary tumour. On a former occasion we mentioned those circumstances in which it differs from cancer,* and endeavoured to point out those dissimilarities which exist between it and other diseases which have been confounded with it under the term fungus hæmatodes. This name has been applied to an immense variety of diseases, which agree in a few leading points, and it appears as if the subject was likely only to be cleared by detaching the more conspicuous varieties, and marking their peculiar characters. For this reason we should prefer calling the present, medullary sarcoma to fungus hæmatodes, since the former appellation very accurately expresses the common appearance of the tumour.

Mr. Abernethy's account of carcinoma, the last species in his arrangement, is the most valuable part of the essay, containing the most succinct yet comprehensive history of the disease we possess. Indeed the essay seems to have been undertaken with a view to establish the characters of this disease, by separating from it a few which agree with it only in

* London Medical Review, Vol. iii. p. 109.

external appearances, and others, which although equally destructive and intractable, are nevertheless perfectly different, and require to be discriminated before any progress can be made in this difficult part of medical science. Some of these, being less destructive than cancer, do not require the same active remedies, which renders a knowledge of the characteristic signs of the latter the more important, that we may know it at an early period, and when the disease is in a small compass, and the operation on that account less formidable. We would gladly transcribe his history of carcinoma, but we are compelled to pass on to his instructive description of the schirrous structure:—

"It is difficult to convey correct ideas of the structure of carcinoma by words or even by drawings. In the generality of instances the diseased part is peculiarly hard, and there are intermixed with it, firm, whitish bands. There is indeed no other striking circumstance which can be mentioned as constantly claiming attention in the structure of this disease. These firm whitish bands sometimes extend in all directions from the middle towards the circumference of a carcinomatous tumour, like rays from a centre, having little intervening matter; sometimes they intersect it irregularly, having interposed between them a firm brownish substance, which may be scraped out with the finger. Sometimes they form cells, containing a pulpy matter of various colours and consistence; and sometimes these bands assume an arborescent arrangement, ramifying through the diseased substance."

We lament that no writer has attempted to analyze the peculiar schirrous structure; we mean, endeavoured to determine to which of the natural tissues that compose animal bodies it is peculiar, for we believe that the different organic alterations are referable to certain structures. The few continental writers who have attempted such investigations, have decided that cancer occurs in such a variety of organs, so different both in function and structure, that it is peculiar to none but involves the whole. There are however, peculiar tissues which

enter into the composition of all organs, such as vessels, nerves, cellular membrane, &c.; and the circumstance of this disease affecting all organs would seem to us to prove that it belongs to one of those structures which contribute to the formation of every part. If we were to hazard a conjecture on the subject, we should fancy it appropriate to that fibrous tissue which composes the cellular membrane, and that from the following circumstances. The appearance and disposition of those membranous bands, which are considered as the criterion of schirrous structure, are very similar to that of the fibrous tissue which composes the cellular membrane. They are firm, and white, and fibrous, divided by septa or forming distinct cells, having generally fat deposited in the interspaces. The appearance of a section of a schirrous tumour may not inaptly be compared to that of a lemon, the membranous bands gradually diverging like rays from a centre, until they are lost in the surrounding cellular substance. Again, schirrus generally commences in parts abounding in cellular membrane, as the surface of the body, and in glands, into the composition of which much of this substance enters. Thus we find it in the mammary gland, and those of a conglomerate structure in general, whilst it is not known in others of a more compact or conglobate form. It is never met with in the kidneys, very rarely in the testicle, and we doubt if ever true schirrus be found in the liver, for that morbid alteration which has been so denominated, differs very essentially from the characters of schirrus in other organs. When the disease attacks membranous or muscular parts, it commences in the cellular membrane that connects them. Thus the schirrous pylorus commences between the peritoneum and muscular coat, and the bands are seen to extend along the cellular membrane that connects the muscular fibres. If schirrus were an entirely new formation, we should expect that it would be contained in some cyst, since that is the case with most of the sarcomata; whereas schirrus is diffused and scattered into the surrounding parts: and lastly, the universality of cellular membrane will account

for the propagation of the disease in every organ, and the failure of most operations performed for its removal.

The present edition contains the result of Mr. Abernethy's experience in the palliative treatment of cancer. It is entirely of a dietetic nature, and refers to the influence which the state of the alimentary system has upon diseases in general.

"There can be no subject which I think more likely to influence the mind of a surgeon, than that of an endeavour to amend and alter the state of a cancerous constitution. The best timed and well conducted operation brings with it nothing but disgrace, if the diseased propensities of the constitution are active and powerful. It is after an operation that, in my opinion, we are most particularly incited to regulate the constitution, lest the disease should be revived or renewed by its disturbance. In addition to that attention to tranquillize and invigorate the nervous system, and keep the digestive organs in as healthy a state as possible, which I have recommended in the first volume, I believe general experience sanctions the recommendation of a mere vegetable, because less stimulating diet, with the addition of so much milk, broth, and eggs, as seem necessary to prevent any declension in a patient's strength."

The remarks on encysted tumours, although not so full or systematically arranged as those on sarcomatous growths, contain many hints of much practical importance. These tumours consist of unorganized matter of various appearances and consistence, secreted by the internal surfaces of cysts of different textures and properties. The cysts, of course, are to be considered as the parts in which the diseased actions reside, and on that account claim our principal attention. It is an object in all tumours to know how far the cyst or capsule partakes of the diseased action, since this knowledge will determine how far its removal is necessary, and would very much facilitate the performance of operations. In many of the sarcomata the cyst appears to be merely an adventitious growth and independent of the morbid actions, for in the adipose

sarcoma, if the contents of the sac be removed, the latter will adhere and not regenerate the disease. But in encysted tumours the cyst may be regarded as the nidus of the diseased actions, and hence its removal is indispensable in the cure. Mr. Abernethy has related some cases which fully prove the truth of these remarks.

There are two other circumstances which claim our attention with regard to encysted tumours. The slightest irritation in them will produce the utmost constitutional derangement, and will often prove fatal. This will not appear very surprising, if we consider the immense surface contained in many of these cysts, and how much the constitution must sympathize with such an extent of inflammation. It teaches us also the danger of irritating wens, either of an irritable nature or occurring in irritable habits. Cysts of this nature, when exposed, are very liable to generate a fungus of so intractable a nature, that it furnishes an additional argument for the complete removal of the disease. Mr. Abernethy has related an instance of this kind, which seems very much allied to some of those cases, termed by Mr. Hey, fungus hæmatodes. He has also appended a history, which proves most strikingly the similarity of these cases with that disease which our author has denominated fungus of the brain, and corroborates very fully an opinion, which we formerly expressed, of the origin of such diseases in the rupture of minute blood-vessels.

"A young man, who was out of health, and complained of stiffness and pain in the bottom of his belly, took to his bed, declaring his inability to move about. Suddenly a swelling formed above Poupart's ligament, which rapidly increased and the skin ulcerated. A frightful fungus seemed to present itself, an uncontrolable hæmorrhage ensued. When the case was examined after death, all that bulged out could be removed by the finger or sponge, and appeared to be coagulated blood rather than fungus; and at the bottom nothing was seen but the abdominal muscles, which had that bruised or brownish appearance which Mr. Hey has described."

Few diseases have been considered more desperate than lumbar abscesses; and their remote situation, and an idea that they are universally connected with a carious state of the vertebræ, has hitherto preserved them from the interference of surgery. Mr. Abernethy's practice and observations have, however, convinced us, that they ought not to be placed on the list of incurables, and prove how far scientific investigation is capable of disarming the most formidable diseases. Lumbar abscesses are generally complicated with a carious state of the vertebræ, and the practice of Mr. Pott successfully proved, how far counter-irritation is capable of arresting this ulcerative process. Chronic abscesses are not in their nature dangerous, whether connected with diseased bones or otherwise, but become so from their magnitude, and the effects which, from this circumstance, they produce on the constitution; whence we clearly see, that the objects of surgery ought to be to prevent their increase or reduce their dimensions. In general they proceed in one tenor from bad to worse, till at length the swelling bursts, fever ensues, the patient becomes hectic and dies. The magnitude of the tumour is the cause of its bursting, and hence, in the cure of all chronic abscesses, the indications are to prevent their increase, and subsequently to promote their dispersion. Counter-irritation and an attention to the general health will often effect this, and leave the cure of the diseased bones a work of subsequent importance.

But the abscess will sometimes continue to increase, the integuments become irritated from distension, and the swelling is proceeding to burst. The question then is, whether we should allow it to open spontaneously or treat it like phlegmonous abscesses. If inflammation supervene and it burst spontaneously, or a permanent opening be made into it, the most horrible effects supervene. A violent degree of irritation takes place in the sac; the constitution sympathizes with such an extensive inflammation; the patient is feverish and generally hectic. This constitutional derangement has generally been imputed to the admission of air into the cavity of the abscess,

or the absorption of pus from it. Neither of these explanations however, appear probable; for the contact of air in an emphysematous state of the cellular membrane, or when blown into the cavities, does not cause inflammation, nor does it on ulcers in a state of disease; nor does the absorption of pus from the surfaces of ulcers and abscesses produce any constitutional derangement. The inflammation seems to be propagated from the opening throughout the immense surface of the cyst, and the constitutional derangement and fever are sympathetic with this great extent of irritation. The object therefore is to evacuate the abscess in such a manner as shall not excite inflammation. This Mr. Abernethy effects by a small puncture through a sound part of the integuments, and immediately closing the wound by the adhesive inflammation. Inflammation rarely follows this operation; the sac contracts and the subsequent collection is evacuated before the distension has brought the cyst to its former magnitude; and by a repetition of this process it is reduced to an extent which allows no dread of inflammation from a permanent opening. This practice is applicable to chronic abscesses in all situations where the extent of the cyst would lead us to dread the effects of its inflammation.

It is this treatment, which Mr. Abernethy ventured to recommend in cases of spina bifida, and which Mr. Okes so prematurely reprobated. Unfortunately for Mr. Okes, at the very time he was writing his book, and in his closet had so decidedly determined the impossibility of the practice, Mr. Astley Cooper, in his great field of experience, had actually proved its excellence in many instances. This gentleman has already committed to the press the accounts of several cases in which this treatment has completely succeeded; and the death of the patient from another cause, in one instance, enabled him to determine that contractability of the membrane, which Mr. Okes had denied. These cases furnish a most complete refutation of Mr. Okes's speculations, and prove how

little dependance should be placed on reasoning which is not deduced from absolute experiment.

The volume before us concludes the series of Mr. Abernethy's observations; constituting, in our opinion, the most valuable addition which has been made to surgery since the time of Mr. Hunter. Our author has pointed out a new source of local diseases; he has discriminated the innumerable affections which emulate the appearance of syphilis; he has boldly advanced the operation of aneurism to an extent, the possibility of which has been denied by many experienced surgeons; and in the present volume he has commenced the cultivation of an immense tract of disease which hitherto knew but one history and one treatment. His book is a simple narration of most important facts, and his deductions from them may be regarded as axioms in the practice of surgery. The progress which his doctrines are daily making is the best earnest of their importance, and the success of his operations is the best answer to those who have denied their possibility. If we have ventured in a few instances to dissent from him, we have only availed ourselves of his readiness "to encounter these risks, when we had it in view to bring a difficult and interesting subject fairly before the public." We are confident that Mr. Abernethy would prefer a free investigation of his opinions, to an obsequious vassalage to his authority. "To exert reason is not to revolt against authority; reason and authority do not move on the same parallel."

ORIGINAL PAPER.

Copy of a Letter from BENJAMIN SILLIMAN, Professor of Chemistry at Yale College, *to* DAVID MELVILLE, Patentee of the Improved Gas Apparatus.

New Haven, August 18th, 1814.

Mr. David Melville,

SIR,

Your favour of the 8th instant is before me, and I beg you to accept my thanks for the enclosed engraving of your apparatus for the gas lights. The print is very handsome, and does good justice to your apparatus. When you were so obliging as to show it to me, during my visit at Newport, last summer, I was agreeably surprised to see an apparatus so perfect, contrived and constructed in this country, where the subject of the gas lights is less generally understood than in Europe. I think your apparatus simple and effectual, and well adapted to the purposes of manufacturing establishments, and the flames which you shewed me were brilliant, and burned without smoke or smell.

Nothing, but a general knowledge of the gas lights, is necessary to introduce them into the large manufacturing establishments, which are now becoming so numerous in our country. They have the strongest recommendation which can address itself to practical men; viz. *economy*. Those who feel particularly interested to know the details of the subject, may find all the information which they can reasonably desire, in very elaborate and minute reports, drawn up from actual experiments, made on a very great scale, in one of the largest manufactories in England, by Mr. Murdock; and in various papers, by Mr. Cook, and others, for which reference may be had to Nicholson's Journal, and other periodical works on science and the arts. It will be found, by referring to these, and other similar sources of information, that the saving pro-

duced by the gas lights as a substitute for oil and tallow, is very great, and in large establishments amounts to a heavy sum. It is probable that circumstances in this country might produce some variation in the result, the degree of which experiment alone can determine. The gas lights are probably less adapted to private families than to public establishments, because, the care and skill which are requisite, are more than can be reasonably expected among common domestics. But, in large manufactories, the business of preparing the gas and of attending on the lights, will of course be assigned to a particular person, who, with a common share of ingenuity, will soon acquire the habit of doing this, as he would any other thing.

Economy is not all which recommends the gas lights; for, were they ever so cheap, if they did not, in a good degree, answer the desired purpose of affording a good light, no one would adopt them. The light from the combustion of the gas from fossil coal, when the coal is of a good quality, is remarkably brilliant and beautiful. I saw a large apothecary's shop in London, lighted with the gas from coal, and as the thing was then (1805) by no means so common in London, as at present, it drew a great concourse of people, every night, around the shop, and thus brought it into general notice. The proprietor of the shop was so civil as to shew me his apparatus, which was arranged in a cellar, beneath the room in which the lights were exhibited; and although the apparatus was a good one, I think it was inferior in several respects to yours. There was, however, one circumstance which struck me as particularly judicious, although I cannot say how generally it is adopted in other establishments of this kind; I allude to the placing of quick lime in the water of the apparatus intended to wash the gas; as the carbonic acid gas is the most troublesome foreign body which is commonly found mixed with the inflammable gas, the lime performs an important service, by removing it more rapidly than the water alone would do, or after it is saturated with it. I have tried many experiments on

different substances, for the purpose of obtaining inflammable gases, to afford light by their combustion. Some sorts of coal give only a poor gas, burning with a pale blue light, and with only a feeble illumination; while from other kinds of coal, the gas gives a rich brilliant light, hardly surpassed by any thing. I believe the Cannel coal is generally used in Great Britain: I have found some specimens of the Richmond coal (Virginia) answer very well; but, few substances which I have tried, afford a richer gas than walnut meats (as they are commonly called), and even the whole of the walnut (shell and all) answers very well, and a quart of walnuts will afford a barrel of gas. Walnuts are too dear in the maritime parts of New England to be substituted for coal, but the hint might be of advantage in some parts of this country, where walnuts abound, and coal is dear. The light from the inflammable gases, when of a good quality, is remarkably steady and uniform; as there is no wick, no snuffing is necessary; and workmen, in manufactories lighted in this manner, are not interrupted as they commonly are in trimming their lamps or snuffing their candles; the light does not become dim occasionally, as that from lamps and candles does; nothing falls from the light, or can possibly fly from it to kindle cotton, linen, or other combustible substances, which abound in many manufactories; and, as the gas light is necessarily confined to the spot where it is used, and as any particular light can be instantly extinguished by simply turning the key of a stop-cock connected with that particular tube, or the whole can be put out by turning the key of the main tube, the security against fire becomes as complete as the nature of combustion will probably ever permit.

It is a circumstance also of no small importance, that a workman may regulate the quantity of light which he wishes, by properly adjusting the key of the stop-cock; if the workman wishes to go away for a time, and still does not choose to extinguish his light, he may, by cautiously closing the key of the stop-cock, reduce the flame to a mere point, which like a little

brilliant star, rests on the orifice of the tube, and will remain so for hours, with scarcely a perceptible consumption of gas; and when the key is again turned back, the light blazes out anew, with its former brilliancy.

Much more might be written on this subject, upon which, sir, you have requested my opinion, but perhaps it is not necessary. If apparatus, materials, and attendance, are not materially more expensive in this country than in England, the gas lights can, and without doubt will be advantageously introduced into our manufactories. I wish you success in your laudable efforts to make this useful and comparatively novel subject known to our countrymen, who are certainly inferior to the people of no country in ingenuity, resource, and enterprise, although they often are, in that perfect knowledge of the subjects to which they turn their attention; which, in older countries, results from a more minute division of labour and employment, and of course a more complete devotion to one object.

I remain, sir, respectfully,
Your most obedient servant,
BENJAMIN SILLIMAN.

References to the Plate representing Melville's Improved Gas Apparatus for lighting manufactories, &c. with gas lights, produced from pit or stone coal.

FIG. I.

AAA. The floor and part of the structure of the gasometer house.

B. A furnace in which the retort is set.

C. The door of the furnace where the fire is placed.

D. The ashes hole.

E. The damper, or register to regulate the draft of the furnace.

F. A cast iron retort (with the door fixed on) in which the coal is put to produce the gas.

G. The condenser and bath.

H. A pipe which conducts the gas from the retort to the condenser and bath, where it passes several times through water, by which it is washed and purified.

I. A cistern set in the ground and kept filled with water by means of an aqueduct, the water from which passes through the bath, to a drain from the gasometer house.

K. The gasometer, or reservoir, which is suspended in the cistern of water, by a rope or chain leading over sheaves to a balance.

L. A pipe which conducts the gas from the condenser, through the water in the cistern, to the gasometer, where it is reserved for use.

M. A stop-cock to let off the gas until it becomes inflammable, and to burn it from, when the gasometer is full, to prevent its escaping underneath.

N. A balance of weights, to hold the gasometer in suspension and (by taking one or more of the weights off) to give force to the gas when necessary.

O. A pipe which conducts the gas from the gasometer house to the apartments where the lights are wanted; where it issues from the burners when vent is given to it, and on the application of a taper will burn with a brilliant flame without smell or smoke. The burners are fitted with keys by which the flames may be regulated, to give more or less light, or instantly extinguished, which operation may be performed on the whole at once, by means of a single key in the main tube.

FIG. II.

P. The form of the burner from which the gas issues, with the tube and glass, and key to regulate the flame, on a larger scale.

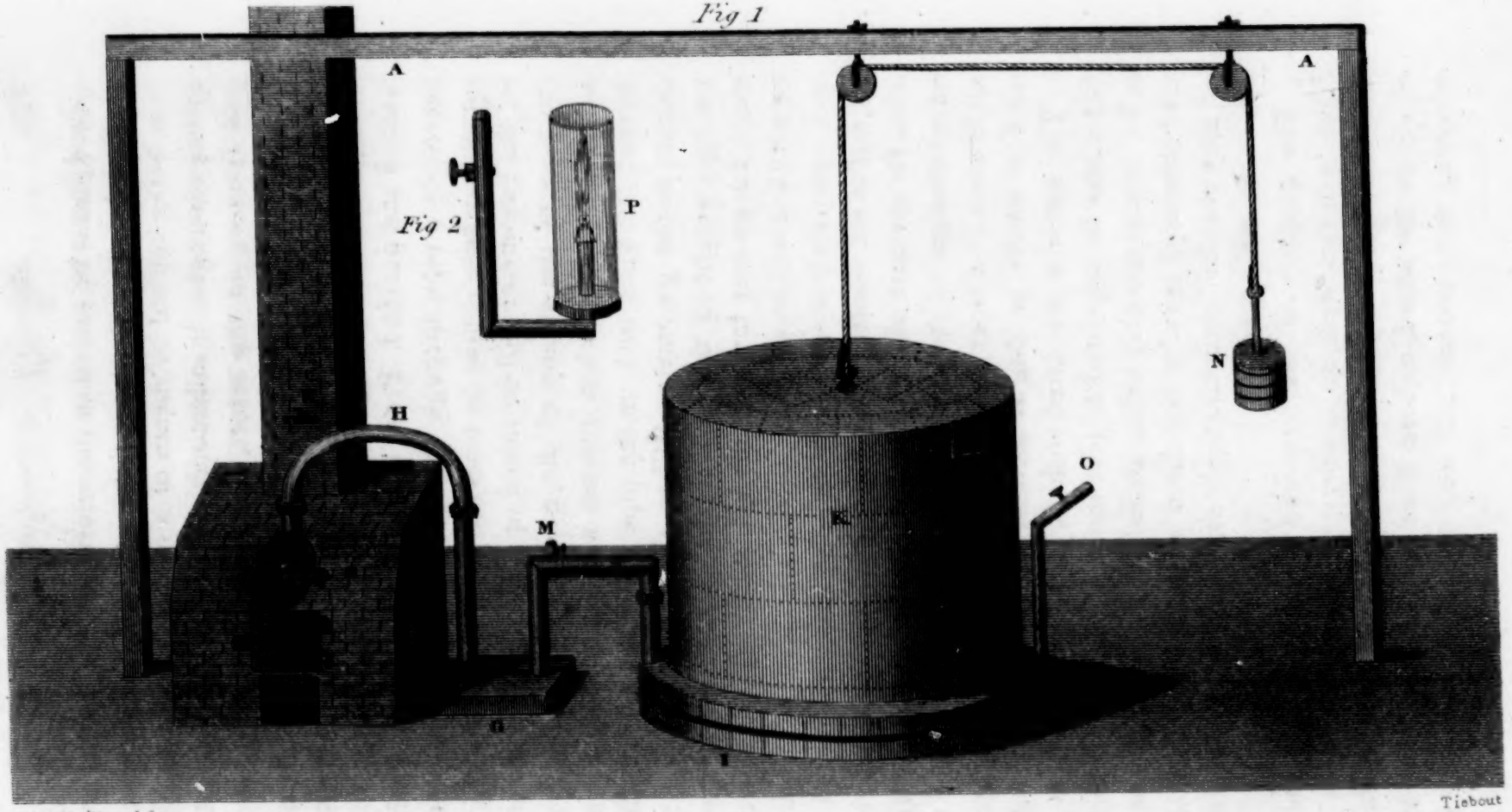
Specification of the mode of operation with Melville's Improved Gas Apparatus for lighting Manufactories, &c., with gas lights.

A quantity of coal in proportion to the number of lights re

quired, must be placed in the retort, and the door screwed on and luted tight with a lute of clay and sand; this done, a strong heat being applied by means of a fire kept up in the furnace, hydrogenous gas, or inflammable air, will be driven out of the coal confined in the retort, and forced through the water in the bath in which the condenser is immersed; by passing through the water, the bituminous matter, which is a component part of the coal, is separated from the gas, which is washed and purified. From the condenser, the purified gas is passed by a pipe through the water in the cistern, to the gasometer, where it may be reserved for use. As the gas passes *in*, the gasometer will be raised up until it is filled; when full, (to prevent the escape of the gas underneath, and the smell which it occasions when it issues without burning,) it may be burned from the cock on the pipe which leads from the condenser to the gasometer. When the lights are required, by taking a weight off the balance, the gasometer bears with so much the greater force on the volume of gas contained in it, by which it will be propelled through the pipes to any distance and in any direction to the burners, which are situated where the lights are wanted. Immediately on the issuing of the gas from the aperture of the burner, and coming in contact with the oxygenous gas of the atmospheric air, it will take flame on the application of a taper, and burn with a brilliant light, without smell or smoke, as long as there is any gas in the gasometer.

The burners are fitted with keys by which each separate flame may be regulated to give more or less light at pleasure, or be instantaneously extinguished; and the whole (be there ever so many) may be regulated as to the size of the flame, or they may be instantaneously extinguished by turning the key in the main tube.

The quantity of coal required for any given number of lights will vary with its quality; the usual quantity is about forty pounds for fifty flames, equal to that of a moulded candle of six to the pound, to burn three hours. Two pecks of coal weighing forty pounds, put into the retort, will leave a resi-



Melville's Patent improved Gas - apparatus.

duum of near three pecks of coak, weighing twenty-eight pounds. The coak is better for many uses than raw coal, and if used in the furnace to extract the gas, will be nearly sufficient fuel for each succeeding operation.

Note.—Any person or company wishing to be furnished with the Improved Gas Apparatus, are requested to apply to Winslow Lewis, Boston, or David Melville, Newport, (R. I.) who are the sole proprietors of the patent right.

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Medical and Philosophical Intelligence.

[From the Monthly Magazine for October, 1814]

It affords us the highest satisfaction to be able to state that the first of practical modern discoveries, the means of illumination by the gas of coal, proceeds in its application with all the success that can be desired. A new establishment has been opened in Worship-street in addition to that in the City Road, and both manufactories are constantly employed in evolving gas, which is preserved in butts, like beer, and sent for use to any distant place at which it is intended to be consumed. Many hundred butts, besides large reservoirs, have thus been manufactured during the summer, and kept in store for the winter. Already above a mile of the public streets is enlightened by this means, besides the Houses of Parliament and many public buildings. The beauty and brilliancy of the light exceed the powers of description, and can only be understood by being witnessed.

A new edition is printing, with considerable enlargements, of Mr. Arthur Young's celebrated Farmer's Kalendar, the most useful and important volume which perhaps ever issued from the press, a judgment in which the public opinion confirms us, by purchasing seven very large editions. Though the illustrious and veteran author is unhappily deprived of the enjoyment of his sight, yet his intellectual vigour continues unimpaired, and has been sedulously employed in the perfection of this favourite work.

Mr. Sawrey is preparing an account of the Morbid Anatomy of the Brain in Mania and Hydrophobia; with the pathology of the two diseases, and experiments to ascertain the presence of water in the ventricles and pericardium; collected

from the papers of the late Dr. Andrew Marshall, lecturer on Anatomy in London.

Dr. Johnson, of Bristol, F. L. S. &c. intends shortly to prepare for the press, a treatise on the medicinal Leech, the outline of which was lately printed at Edinburgh, under the title, "*Disputatio physica inauguralis quædam de Hirudine complectens.*" It is the Doctor's intention to describe minutely the singular structure of this interesting and useful animal, and to illustrate his description by engravings.

In this country (Sweden) Dr. Jenner ranks as one of the greatest benefactors of the human race, and vaccination is performed on all children within nine days from the time of their birth. The court, the clergy, and the medical profession, have zealously concurred; and, in consequence, the scourge of the small-pox is considered as extirpated from that country. Dr. Hedin's Report of these happy results has been reprinted by our House of Commons.

Smithson Tenant, Esq. has discovered a new method of double distillation by means of steam, whereby double the quantity of fresh water may be raised from salt water in a ship's kettle, that has hitherto been obtained. The circumstantial description of his process shows how steam can be made to pass through water, and thus contribute to evaporise it, so that an additional quantity of fresh water may thus be procured in the same time and with the same apparatus from sea-water at sea.

Mr. Housham has published a Series of Observations on the Formation of Human Bones. He began with a child or fœtus only seven weeks old, and continued his observations at different times for several years. He inspected the process by means of a powerful microscope, from which he observed that

the arteries secrete a mucilage which forms cartilage; that the cartilage shortly becomes tubular, with numerous spiculæ around it containing phosphate of lime; that in the course of time bony matter is completely deposited; and that, finally, laminæ appear. He describes with great minuteness the various forms which the matter assumed during the entire process of ossification, and also the structure of the most perfect bones, their nerves, blood-vessels, membranes, periosteum, &c.

PHILADELPHIA DISPENSARY.

FROM the Annual Report, published by the Managers, on the 26th instant, it appears that THREE THOUSAND FIVE HUNDRED AND TWENTY-SEVEN PATIENTS have been attended by the Physicians of the Dispensary from December 1st, 1813, to December 1st, 1814.

Patients remaining from last year - - -			110
Admitted since that time - - - -			3417
Of these the number Cured is - - -	3311		
Relieved - - -	46		
Dead - - -	72		
Removed - - -	19		
Irregular - - -	19		
Remaining under care -	60		
		——	3527

The small number of deaths may be accounted for, by observing, that of these Patients, there are many cases of vaccination and of pregnancy. A considerable proportion of trivial cases also necessarily occur in an institution of this nature.

The receipts of the Dispensary during the past year, have been - - - - -	2086	15
Balance due the Treasurer - - - - -	21	74
	$2107	89
The expenditures, including balance due the Treasurer last year, and the payment of some of last year's accounts, have been	$2107	89

December, 1814.

METEOROLOGICAL OBSERVATIONS.

State of the weather during the last six months of 1814.

July.

Thermometer—Lowest at 8 A. M. 60. 13th of the month.
Highest at 3 P. M. 85. 17th
Mean, ... 70.

Winds—westerly—frequent rains—an uncommonly cool month.—A violent tornado on the 1st, at Beaufort, South Carolina—28th of the month a very heavy rain at Philadelphia, commencing at 8 P. M., and continued for twelve hours.

August.

Thermometer—Lowest at 8 A. M. 60. 22d of the month.
Highest at 3 P. M. 85. 16th.
Mean . . . . 72.

Winds—chiefly westerly—several rains—measles continue—plague at Smyrna this summer.

September.

Thermometer—Lowest at 8 A. M. 51. 26th of the month.
Highest at 3 P. M. 82. 4th.
Mean, ... 65.

Winds—variable from west to east—considerable rain—an aurora borealis on the 11th—on the 6th and 7th, frost at Quebec, so severe as to destroy nearly all the tobacco, melon, and cucumber plants, and the potato stalks—it was preceded by very warm weather, rain and thunder. The yellow fever prevailed at Gibraltar on the 16th, and at Cadiz on the 25th of this month.

October.

Thermometer—Lowest at 8 A. M. 38. 24th of the month.
Highest at 3 P. M. 77. 3d.
Mean, ... 50.

Winds—much easterly wind—very fine clear weather with

little interruption. The crops of grain have been good, and well got in—the fruits of the earth plentiful and in perfection.

NOVEMBER.

Thermometer—Lowest at 8 A. M. 31. 29th of the month.
Highest at 3 P. M. 65. 14th.
Mean, ... 45.

Winds—northerly—but little rain—a smart shock of an earthquake, felt in Maine, Massachusetts and Rhode-Island, on the 28th, between 7 A. M. and 15 minutes past 7, in these different places.

DECEMBER.

Thermometer—Lowest at 8 A. M. 20. 26th of the month.
Highest at 3. P. M. 47. 1st.
Mean, ... 30.

Winds—westerly. First snow on the 6th, light—snow six inches deep on the 10th—ice in the river on the 12th—a meteor seen here and at New York on the 19th, about six minutes before 5 o'clock, A. M. Spotted fever appeared in Vermont and New Hampshire—the measles have continued throughout the year in this city, but have not been very prevalent—no small-pox.

RECENT BRITISH PUBLICATIONS.

A Practical Treatise on Porrigo or Scalded Head, and on Impetigo, the humid or running Tetter, with coloured engravings figurative of the diseases. By the late Robert Willan, M. D. F. R. S. and F. A. S.

Tracts on the Gout, illustrated by numerous cases; and on some Internal Inflammatory Affections, by Thomas Sutton, M. D. of the Royal College of Physicians, &c. &c.

Facts and Observations relative to the Fever, commonly called Puerperal. By J. Armstrong, M. D.

The Medical Guide for Tropical Climates, &c. by Richard Reece, M. D.

Veterinary Medicine and Therapeutics, containing the Effects of Medicines on various Animals; the symptoms, causes

and treatment of Diseases, with a select collection of Formulæ. Pt. I. The Materia Medica, pharmaceutical preparations and compositions. Pt. II. The Disorders incident to neat cattle, arranged according to the Nosology of Cullen, by W. Peck, Lond.

Lectures on Comparative Anatomy, with one hundred and thirty-two engravings. By Sir Everard Home, Bart. F. R. S. 2 Vols. royal 4to.

Enquiry into the Probability and Rationality of Mr. Hunter's Theory of life. By John Abernethy, F. R. S. 8vo.

Observations on the Diseases of Females; by Charles Mansfield Clarke, illustrated by copper-plates. Pt I. Royal 4to.

A Treatise on Hernia, by Antonio Scarpa; translated from the Italian by John Henry Wishart. 8vo.

Commentaries on the Treatment of the Venereal Disease, particularly in its exasperated state. By Edward Geoghegan. Octavo.

Practical Essay on the Diseases of the Absorbent System. By William Goodlad. 8vo.

An Essay on Medical Economy, comprising a sketch of the state of the Profession in England, and the outlines of a plan calculated to give to the Medical Body in general an increase of usefulness and respectability. 8vo.

An Essay on the Prevention and Cure of Insanity; with Observations on the Rules for the Detection of the Pretenders to Madness. By George Nesse Hill. 8vo.

An Account of Baths and of a Madeira House at Bristol; with a drawing and description of a Pulmoneter; and Cases showing its utility in ascertaining the state of the Lungs, in diseases of the Chest. By Edward Kentish, M. D. 8vo.

Results of Experience in the Treatment of Cases of Defective Utterance, from deficiencies in the roof of the mouth, and other imperfections and mal-conformations of the Organs of Speech. By John Thelwall, Esq. 8vo.

A Treatise on Hydrocephalus, or Dropsy of the Brain. By James Carmichael Smyth, M. D. F. R. S. 8vo.

An Account of the most important recent Discoveries and Improvements in Chemistry and Mineralogy to the present time; being an Appendix to the Dictionary of Chemistry and Mineralogy. By A. and C. R. Aikin. 4to.

Facts and Observations deduced from long and extensive Practice on Liver Complaints and Bilious Disorders in general, and on such derangements of these Organs as influence

the Biliary Secretions, with some New and Practical Observations on the various appearances of this important Secretion; connected by an appropriate and successful mode of Treatment, and the whole illustrated and confirmed by a numerous List of Cases; by John Faithhorn, formerly surgeon in the East India Company's service. 8vo.

An Essay on the Venereal Disease; by Richard Carmichael, M.R.I.A. Part I. 4to.

The London Dispensatory; by Anthony Todd Thomson. Octavo.

Animated Nature, or Elements of the Natural History of Animals: illustrated by short Histories and Anecdotes; by the Rev. W. Bingley, A. M. 12mo.

A General Description of Shells, arranged according to the Linnean System; by William Wood, F. R. S. and L. S. &c. No. IV. 8vo.

Manual of Mineralogy; by Arthur Aikin. cr. 8vo.

New and correct Tide Tables at all the Sea Ports in Europe; by Alexander Ingram. 12mo.

Experiments and Observations on the Atomic Theory and Electrical Phenomena; by Wm. Higgins, Esq. F. R. S. and M.R.I.A. 8vo.

T. Dobson has in the Press

Dr. Cullen's First Lines of the Practice of Physic, with Notes and Additions, by B. S. Barton, M. D. Professor of the Theory and Practice of Medicine in the University of Pennsylvania.

Swediaur on the Venereal Disease, complete. Translated from the French, by Thomas T. Hewson, M. D.

Bradford and Read, of Boston, propose publishing Fordyce on Fevers.

*** The publication of this Number of the Eclectic Repertory has been delayed for three months, on account of the Printers having been called off to military duty.

In future volumes of this work, it is intended to publish the first number of each in January of each year.